

3 1761 11557992 2







Canada. Dept. of Indian Affairs and Northern Development  
Industrial Division

[Area economic survey] 68/3



Digitized by the Internet Archive  
in 2022 with funding from  
University of Toronto

<https://archive.org/details/31761115579922>





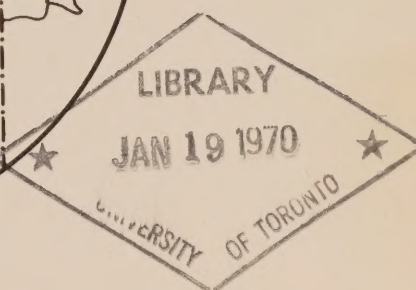




5900

# THE LOWER LIARD REGION

## AN AREA ECONOMIC SURVEY



INDUSTRIAL DIVISION

G.M. HIGGINS

NORTHERN ADMINISTRATION BRANCH  
DEPARTMENT OF INDIAN AFFAIRS  
AND NORTHERN DEVELOPMENT





CA1 IA41-69L54

# THE LOWER LIARD REGION

an area economic survey

1968

A.E.S.R. #68/3

by

G. Higgins

The views, conclusions and recommendations expressed herein are those of the author and not necessarily those of the Department of Indian Affairs and Northern Development.

Industrial Division,  
Department of Indian Affairs  
and Northern Development.

Ottawa, April 1969.



©  
QUEEN'S PRINTER FOR CANADA  
OTTAWA, 1969

Cat. No.: R53-1/68-3



## PREFACE

This report is one of a series of Area Economic Surveys carried out by the Industrial Division of the Department of Indian Affairs and Northern Development.

These surveys are a continuing part of the Department's efforts to determine the basis for local economic and social progress in the Northwest Territories. Basically the surveys are intended to:

- 1) Assess the renewable resources as to their ability to sustain the local population.
- 2) Determine the degree of exploitation of these resources and the efficiency of their use.
- 3) Investigate and explain the social and economic factors affecting resource utilization.
- 4) Recommend ways and means whereby the standard of living of the local people might be improved.

As the reasons for these surveys are practical, the material presented in the reports is selected for its relevance in this respect; much academic material gathered in the course of the investigation which may have been taken into account in the deliberations is necessarily excluded from these reports. On the other hand, authors have been given wide latitude in their approach and have been encouraged to give consideration to key problems of a theoretical nature and to include such theoretical argument where its inclusion is thought to contribute to the understanding of the material presented and of the practical conclusions drawn.

The reports are published primarily for use within the Department, for distribution to other interested government agencies and for limited distribution to libraries, universities and organizations and individuals actively engaged in northern research, administration or development.

---

The following reports in this series have been published to date or are in preparation:

| <u>Title A.E.S.R.</u>                  | <u>Author</u> |
|--|---------------|
| 58/1      Ungava Bay                   | J. Evans      |
| 60/1      The Squatters of White-horse | J. Lotz       |
| 62/1      Southampton Island           | D. Brack      |

|      |                                |                          |
|------|--------------------------------|--------------------------|
| 62/2 | Tuktoyaktuk-Cape Parry         | G. Abrahamson            |
| 62/2 | Western Ungava                 | R. Currie                |
| 63/1 | The Copper Eskimos             | G. Abrahamson            |
| 63/2 | Keewatin Mainland              | D. Brack and D. McIntosh |
| 63/3 | Yukon Territory Littoral       | R. Currie                |
| 65/1 | Banks Island                   | P. Usher                 |
| 65/2 | Northern Foxe Basin            | G. Anders                |
| 66/1 | The Mackenzie Delta            | D. Bissett               |
| 66/2 | Rae-Lac La Martre              | G. Anders                |
| 66/3 | Frobisher Bay                  | S. MacBain (Miss)        |
| 66/4 | East Coast-Baffin Island       | G. Anders, Ed.           |
| 67/1 | Lancaster Sound                | D. Bissett               |
| 67/2 | South Coast - Baffin Island    | G. Higgins               |
| 67/3 | South Shore - Great Slave Lake | D. Radojicic             |
| 67/4 | Central Mackenzie              | D. Villiers (Miss)       |
| 68/1 | Central Arctic                 | D. Villiers (Miss)       |
| 68/2 | Keewatin Mainland Re-appraisal | D. Radojicic             |
| 68/3 | Lower Liard Region             | G. Higgins               |



Table of Contents

|  | <u>Page</u> |
|--|-------------|
| PREFACE .....  | iii         |
| INTRODUCTION .....                                     | 1           |
| ACKNOWLEDGEMENTS .....                                 | 3           |
| CHAPTER 1 - PHYSICAL ENVIRONMENT                       |             |
| Physiography .....                                     | 5           |
| Geology .....  | 8           |
| Hydrology .....  | 13          |
| Climate .....  | 18          |
| Vegetation .....                                       | 22          |
| Sites (population centres) .....                       | 23          |
| Summary .....  | 26          |
| CHAPTER 2 - COMMUNICATION SYSTEMS                      |             |
| Radio .....  | 33          |
| Telephone & other land-line facilities .....           | 35          |
| Mail & parcel-post .....                               | 36          |
| Air carriers .....                                     | 37          |
| River barge .....                                      | 39          |
| Roads .....  | 45          |
| Improvement & expansion of communication systems ..... | 49          |
| Summary .....  | 50          |
| CHAPTER 3 - POPULATIONS                                |             |
| Introduction .....                                     | 57          |
| Fort Liard .....                                       | 63          |
| Nahanni Butte .....                                    | 68          |
| Trout Lake .....                                       | 71          |
| Jean Marie .....                                       | 73          |
| Fort Simpson .....                                     | 75          |
| Tungsten .....   | 81          |

|   | <u>Page</u> |
|---|-------------|
| Pointed Mountain .....  | 82          |
| Prairie Creek.....  | 82          |
| Camsell Bend .....  | 82          |
| Trout River .....   | 82          |
| Summary .....   | 82          |
| <br>CHAPTER 4 - POPULATION CENTRES                                      |             |
| Introduction.....   | 85          |
| Fort Liard.....   | 89          |
| Nahanni Butte .....   | 97          |
| Trout Lake.....   | 102         |
| Jean Marie .....  | 105         |
| Fort Simpson.....   | 109         |
| Tungsten.....   | 121         |
| Pointed Mountain .....  | 123         |
| Prairie Creek.....  | 124         |
| Camsell Bend .....  | 124         |
| Trout River .....   | 125         |
| Summary .....   | 126         |
| <br>CHAPTER 5 - NATURAL RESOURCES                                       |             |
| Introduction.....   | 127         |
| Part 1 - Fauna.....   | 129         |
| Part 2 - Forests .....  | 145         |
| Part 3 - Arable land .....  | 151         |
| Part 4 - Water .....  | 153         |
| Part 5 - Minerals .....   | 158         |
| Part 6 - Park & Recreation lands .....                                  | 169         |
| Summary .....   | 173         |
| <br>CHAPTER 6 - CURRENT ECONOMIC ACTIVITIES IN THE<br>PERMANENT CENTRES |             |
| Introduction .....  | 175         |
| Fort Liard.....   | 178         |

|  | <u>Page</u> |
|--|-------------|
| Nahanni Butte .....  | 188         |
| Trout Lake.....  | 192         |
| Jean Marie .....   | 196         |
| Fort Simpson.....  | 201         |
| Some aspects of the work-force in the non-permanent centres .. | 213         |
| Summary .....  | 216         |
| <br>CHAPTER 7 - POTENTIAL FOR ECONOMIC GROWTH                  |             |
| Introduction.....  | 219         |
| Natural resources .....  | 220         |
| Priority / time category for natural resources .....           | 230         |
| Economic implications for the permanent centres .....          | 230         |
| Implications for the Indian populations .....                  | 236         |
| Summary .....  | 237         |
| <br>CONCLUSIONS & RECOMMENDATIONS .....                        | <br>241     |
| REFERENCES .....   | 245         |



TABLES

|   |     |
|---|-----|
| 1 - River discharges .....  | 16  |
| 2 - Climatic data .....   | 20  |
| 3 - Dates of freeze-up and break-up .....                                 | 21  |
| 4 - Movement of mail and parcel-post .....                                | 36  |
| 5 - Passenger and freight movements, Pacific Western Airlines .....       | 38  |
| 6 - Air charter and incidental freight rates .....                        | 39  |
| 7 - N.T.C. freight movements into Fort Simpson .....                      | 41  |
| 8 - Current N.T.C. tariff structure .....                                 | 41  |
| 9 - Lindberg Transport Ltd., freight movements and tariff structure ..... | 42  |
| 10 - Population vital statistics, Fort Liard .....                        | 68  |
| 11 - Population vital statistics, Nahanni Butte .....                     | 71  |
| 12 - Population vital statistics, Trout Lake .....                        | 73  |
| 13 - Population vital statistics, Fort Simpson Band (Band 09) .....       | 81  |
| 14 - Violations - law enforcement - Fort Liard area .....                 | 90  |
| 15 - Enrollment data, Fort Liard, Federal Day School .....                | 93  |
| 16 - Attendance data, Fort Liard, Federal Day School .....                | 94  |
| 17 - Native housing, Fort Liard .....                                     | 95  |
| 18 - Enrollment data, Nahanni Butte, Federal Day School .....             | 100 |
| 18A - Occupation density in Native housing, Nahanni Butte .....           | 101 |
| 19 - Native housing, Trout Lake .....                                     | 104 |
| 20 - Enrollment data, Jean Marie .....                                    | 107 |
| 21 - Native housing, Jean Marie .....                                     | 108 |
| 22 - Violations - law enforcement - Fort Simpson .....                    | 110 |
| 23 - Vehicles, Fort Simpson .....   | 113 |
| 24 - Enrollment data, Fort Simpson, Federal Day School .....              | 114 |
| 25 - Enrollment data, Fort Simpson, Hostel Complex .....                  | 115 |
| 26 - Enrollment data, Tungsten, Federal Day School .....                  | 123 |
| 27 - Harvesting of fur-bearing species, Fort Simpson area .....           | 134 |
| 28 - Harvesting of fur-bearing species, Fort Liard area .....             | 135 |
| 29 - Harvesting of game species, Fort Simpson area .....                  | 137 |

|   |     |
|---|-----|
| 30 - Harvesting of game species, Fort Liard area.....                   | 138 |
| 31 - Harvesting of fishes, Lower Liard Region.....                      | 139 |
| 32 - Summary of fire activity within and without the protected area.... | 146 |
| 33 - Capital investment, Fort Liard .....                               | 179 |
| 34 - Distribution of income by household, Fort Liard .....              | 180 |
| 35 - Average prices for raw furs .....                                  | 185 |
| 36 - Consumption of fuel-oil, 1967/68, Fort Liard .....                 | 187 |
| 37 - Capital investment, Nahanni Butte.....                             | 189 |
| 38 - Distribution of income by household, Nahanni Butte .....           | 190 |
| 39 - Capital investment, Trout Lake .....                               | 193 |
| 40 - Distribution of income by household, Trout Lake.....               | 194 |
| 41 - Capital investment, Jean Marie .....                               | 197 |
| 42 - Distribution of income by household, Jean Marie .....              | 198 |
| 43 - Capital investment, Fort Simpson.....                              | 202 |
| 44 - Distribution of income by ethnic groups, Fort Simpson .....        | 204 |
| 45 - Per capita income by ethnic groups, Fort Simpson.....              | 206 |
| 46 - Distribution of income by sources, Fort Simpson .....              | 206 |
| 47 - Fur-bearing fauna species, sales and prices, Fort Simpson.....     | 208 |
| 48 - Trapping income - aggregating trader & private sales, Fort Simpson | 208 |
| 49 - Consumption and cost of fuels, Fort Simpson.....                   | 210 |

## MAPS

|   |      |
|---|------|
| 1 - Location map, Lower Liard Region.....                   | xiii |
| 2 - Physiography .....                                      | 27   |
| 3 - Geology .....   | 29   |
| 4 - Drainage & Related Data .....                           | 31   |
| 5 - Status of Road & Rail Routes.....                       | 55   |
| 6 - Seasonal Distribution of Population, Fort Liard.....    | 66   |
| 7 - Identification & Distribution of Natural Resources..... | 141  |
| 8 - Fur & Fish Harvesting Areas.....                        | 143  |
| 9 - Merchantable Forest Cover.....                          | 149  |
| 10 - Mackenzie Forest Service Fire Control Areas.....       | 150  |

|  | <u>Page</u> |
|--|-------------|
| 11 - Arable Land.....                        | 155         |
| 12 - Mineral Activity and Distribution ..... | 165         |
| 13 - Location of plate subjects.....         | 277         |

## FIGURES

|   |    |
|---|----|
| 1 - Communication Systems Diagram.....                              | 53 |
| 2 - Classification of Population Centres.....                       | 58 |
| 3 - Population Structure, Fort Liard .....                          | 65 |
| 4 - Population Structure, Nahanni Butte.....                        | 69 |
| 5 - Population Structure, Trout Lake.....                           | 72 |
| 6 - Population Structure, Jean Marie.....                           | 74 |
| 7 - Population Structure - Permanent White Component - Fort Simpson | 76 |
| 8 - Population Structure - Metis Component - Fort Simpson.....      | 77 |
| 9 - Population Structure - Indian Component - Fort Simpson .....    | 78 |

## PLATES

|  |     |
|--|-----|
| 1 - Little Doctor Lake .....                             | 6   |
| 2 - Interior Plains .....                                | 7   |
| 3 - Twisted Mountain .....                               | 10  |
| 4 - Devonian Shales.....                                 | 11  |
| 5 - Drainage, Interior Plains.....                       | 12  |
| 6 - Caving of River Banks, Deadmen Valley.....           | 15  |
| 7 - Marshalling Area for River Barging, Fort Nelson..... | 43  |
| 8 - Sectional River Barge, Fort Nelson.....              | 44  |
| 9 - Barging Petroleum Exploration Equipment.....         | 45  |
| 10 - Highway Construction .....                          | 47  |
| 11 - Nahanni Butte (settlement) .....                    | 98  |
| 12 - Trout Lake (settlement).....                        | 103 |
| 13 - Jean Marie.....                                     | 105 |
| 14 - Causeway at Fort Simpson.....                       | 109 |
| 15 - St. Margaret's Hospital .....                       | 111 |
| 16 - Fort Simpson Hotel .....                            | 120 |

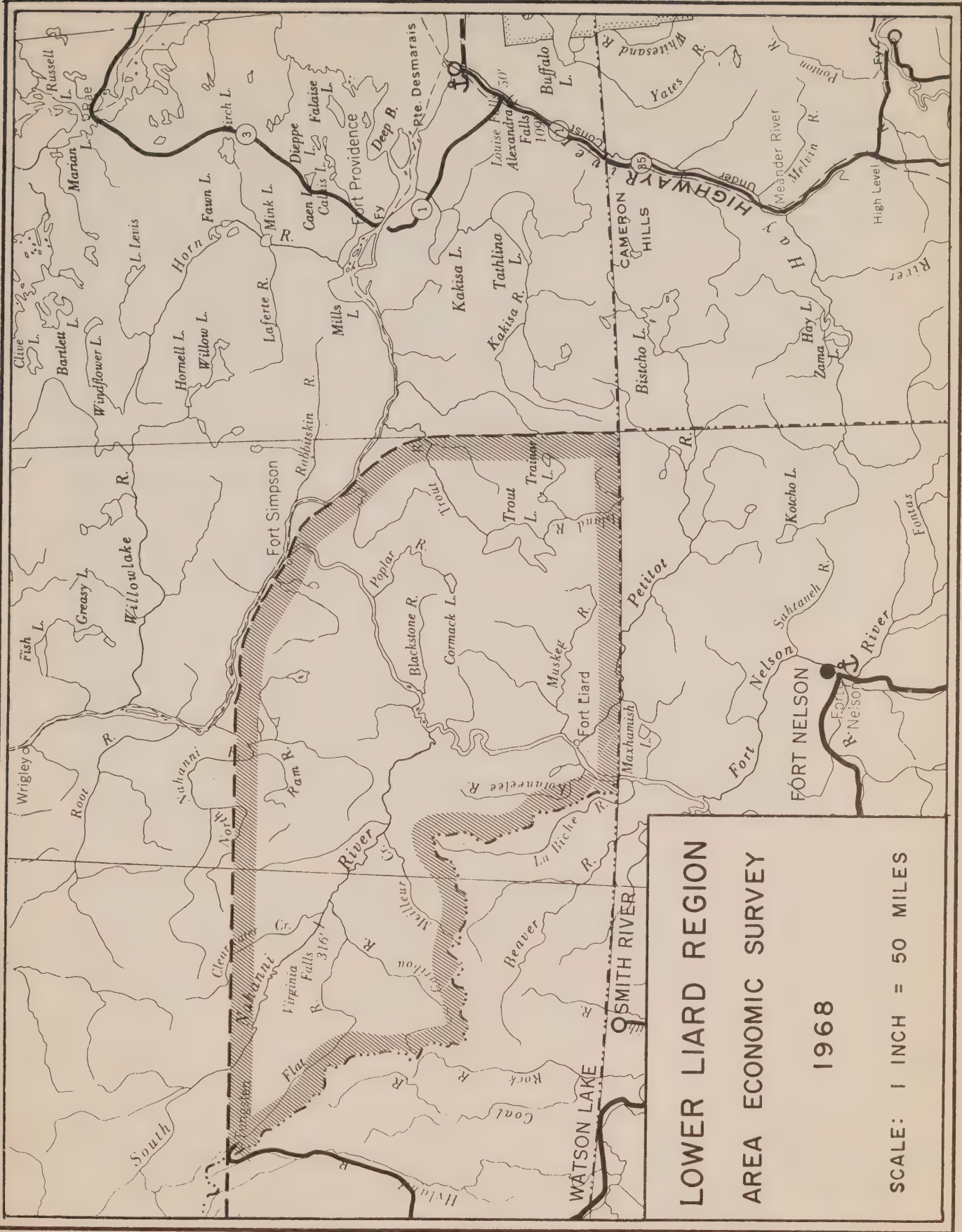


|   | <u>Page</u> |
|---|-------------|
| 17 - Tungsten Town-site.....                  | 121         |
| 18 - Prairie Creek.....                       | 124         |
| 19 - Trout-River Construction Camp.....       | 125         |
| 20 - Kitchen Garden.....                      | 152         |
| 21 - Thermal Spring .....                     | 157         |
| 22 - Open-Pit, Tungsten.....                  | 161         |
| 23 - Number 2 Vein System, Prairie Creek..... | 162         |
| 24 - Virginia Falls & The Gate .....          | 170         |
| 25 - Shittaker Falls .....                    | 171         |
| 26 - Little Doctor Lake.....                  | 172         |
| 27 - Trout Lake .....                         | 174         |
| 28 - Jean Marie Saw-Mill.....                 | 200         |

## APPENDICES

|  |     |
|--|-----|
| 1 - Vegetation Types in Recent & Older Floodplains .....           | 247 |
| 1A - CNT Rates for Radio and Land-Line .....                       | 249 |
| 2 - Barging Equipment, Northern Transportation Company .....       | 253 |
| 3 - Site Plan - Fort Liard .....                                   | 255 |
| 4 - Site Plan - Nahanni Butte.....                                 | 257 |
| 5 - Site Plan - Trout Lake .....                                   | 259 |
| 6 - Site Plan - Jean Marie .....                                   | 260 |
| 7 - Site Plan - Fort Simpson .....                                 | 261 |
| 8 - Equipment Inventory, Simpson Construction Ltd., Fort Simpson.. | 263 |
| 9 - Site Plan - Tungsten .....                                     | 264 |
| 10 - Summaries of Area & Volume for Mature Cover Types .....       | 265 |
| 11 - Some Representative Food Prices, Fort Simpson .....           | 268 |
| 12 - Reconnaissance of the South Nahanni River .....               | 269 |









## INTRODUCTION

The Lower Liard Region as defined in this report comprises an area of approximately 28,000 square miles in the south-west corner of Northwest Territories, adjacent to British Columbia and Yukon Territory. This region is bisected by the Liard River along its course from the border with B.C. to its confluence with the Mackenzie River at Fort Simpson. A rugged mountainous area lies to the west and a low-lying plains area to the east. Map 1 shows the general boundaries of the Lower Liard Region.

Several population pockets, some widely scattered, are present including locations such as Fort Liard, Nahanni Butte, Trout Lake, Jean Marie, Tungsten and Fort Simpson. The population density (permanent population) is less than .03 persons to the square mile.

The permanent population is predominantly Indian with minor elements of White settlers and Metis. The Indians are of the Slave Tribe, a part of the Athabaskan Linguistic Group. Virtually all are Treaty Indians. Comparatively few own their own land. A large number of Indians of Band 10 (Fort Liard) migrate each year to locations in British Columbia and selected locations in Northwest Territories. This is the only group of Slave Indians in the Lower Liard Region who still hold to their former, semi-nomadic character. All others remain close to their respective settlements of residence.

Travel is by means of aircraft, boat and on foot during the summer months, and by aircraft, vehicles, dog-teams and on foot during the winter. The mountainous areas are difficult of access during all seasons. Travel over the Interior Plains is easiest in the cold months when the extensive muskegs are frozen. The muskegs and the generally small rivers on the plains render travel by canoe or on foot very difficult so float-equipped aircraft are used to take advantage of the numerous lakes.

The principal economic input into the region derives from the Federal and Territorial Governments acting in their multiple roles in construction, transportation, education, health, community development projects, and through social assistance and other benefits. A few entrepreneurs have established active enterprises in Fort Simpson. These are important to the economy of that settlement but are not effectual in the regional sense.

The region is endowed with an interesting and diverse natural resource potential not precisely duplicated elsewhere in N.W.T. in their diversity and proximity to tide-water via easily extendable lines of communication. Only the hydrocarbon resources have received a concerted and systematic effort at exploitation on the large scale. Metallic minerals are being fully exploited at one location in the region and are being subjected to advanced exploration

techniques in at least two others. None of the major elements of renewable resources have been exploited in any worthwhile degree but appear to possess a quite significant potential.

The permanent population, especially the Indian element, appears not to have benefitted directly to any marked degree from the measure of exploitation that has occurred in the region in recent years. The exploitive developments so far have concerned the non-renewable resources exclusively; they are highly technical, and are virtually shut-off to the native as a reservoir of employment. This, at least, will hold true until the obligations and responsibilities associated with the exercising of skills are fully understood and practiced by Indians. On the whole, the exploitation of some elements of the renewable resource spectrum holds greatest promise of early direct benefit to the Indian and Metis populations of the region.

Barring unforeseen events of other than purely regional character, it would seem a certainty that the next five to ten years will bring about greater socio-economic change in the Lower Liard Region that was achieved since Alexander Mackenzie's visit nearly 180 years ago.

The timely and orderly development of the natural resources of the Lower Liard Region, as well as the evolvment of definitive targets over the entire socio-economic spectrum, will depend upon the quality and scope of regional planning that can be achieved by the several Governments concerned during the next few years. The sphere of cooperation and planning most critical to the subject region is deemed in this report to revolve about the Provinces which border on the immediate south; most particularly British Columbia.

The field phase of the survey was conducted by the author during the months of June through August, 1968. During this time every effort was made to cover the region as effectively as possible commensurate with the general nature of the study itself.

In the original definition of the region the settlements of Fort Simpson and Jean Marie were deemed to lie outside the Lower Liard Region proper. However, as Fort Simpson is the seat of the administrative area within which the study region is situated, many of the pertinent records are kept there. In these circumstances it became necessary to spend considerable time at Fort Simpson so data concerning it were accumulated and are presented in the succeeding chapters of the report. Jean Marie, a small population centre located above Fort Simpson on the Mackenzie River, was visited by boat and is included in the report as well.

Mr. Fred Sibbeston, a Metis resident of Fort Simpson, was engaged for the purpose of assisting the author in a reconnaissance of the South Nahanni River by boat from Fort Simpson. The river and its immediate vicinity possesses a recognized tourist potential but it was deemed advisable to



re-assess this in the light of changing conditions in the region. The trip had to be abandoned at the mouth of the Flat River, about eighteen miles below Virginia Falls, due to unusually high flooding of the river and the uncommon amount of debris being transported by the swift current. The reconnaissance was nonetheless valuable. The extent of river travel was 380 miles, and the return trip as far as Nahanni Butte required about seven days.

Following a stay of two weeks at Nahanni Butte, removal to Fort Liard was arranged by private charter-aircraft. The duration of stay at Fort Liard was one month, interrupted by a four-day visit to Fort Nelson, B.C. for the purpose of obtaining data pertinent to barging traffic on the Liard River between the two Forts.

From Fort Liard, an air reconnaissance was made over the Liard structural basin to the southerly and easterly limits of the study region. A stop-over was made at Trout Lake en route to Fort Simpson. While based there, charter flights were made to Tungsten, Pointed Mountain and Prairie Creek; all resource development sites. The longest single flight was to Tungsten with a return distance of roughly 520 miles.

The last ten days of August were spent at Yellowknife, Hay River, Fort Smith and Edmonton in order to complete survey information. Altogether, some 2500 miles of air travel and over 400 miles of travel by boat were required within the region during the course of the field work.

Finally, the survey cannot hope to supply definitive solutions for the relatively complex socio-economic problems facing the Lower Liard Region. This, in spite of the fact the Region holds considerable promise for meaningful socio-economic growth when viewed in broad perspective with parts of Northern British Columbia. Such solutions must issue from those charged with the responsibility of weighing the attributes of one region against those of another in the wider scene of development priorities. The real objective of the survey is to present information suggesting guide-lines which it is hoped will assist the authorities in that task.

The author has attempted to achieve a balance in subject matter reasonably commensurate with the stated objective and has drawn information from published matter, individuals, private companies and other government departments wherever to do so would add materially to the study. The drafting of companion maps and preparation of the report were carried-out in Ottawa during the winter of 1968.

#### ACKNOWLEDGEMENTS

The author expresses his appreciation for the generous assistance and hospitality given by the numerous private companies, private individuals and Government Departments throughout the survey.

J.D. Goodall, Simpson Construction Ltd., J.R. Cree, J.R. Cree Bulk Oil Sales Ltd., M. Fairbrother, Mark's Northern Service Ltd., P. Cowie, Arctic Air Ltd., E. Lindberg, Lindberg Transport Ltd., S. Bremner, Hudson's Bay Co., Messrs. J.D. Goss and C.M. Vuckets, Canadian National Telecommunications, Messrs. A.J. Hamilton and F. Pennell, Swanson Lumber Co., Messrs. F. Hall and E. Hoddinott, Canada Tungsten Mining Corp., A.O. Wiltzen, Western Construction & Lumber Co., J.A. Harquail, Redstone Mines Ltd., Messrs. K. Christie and R. Fast, Cadillac Explorations Ltd., B. Dahl, Kaps Transport Ltd., W. Levine, Edmonton Fur Auction Sales, and the Petroleum Industry.

-----  
 Father P. Mary, O.M.I., M. Zemliak, G. Kraus, A.G. Turner, F. Sibbeston and Father H. Posset, O.M.I.

-----  
 Dept. of Public Works, Dept. of Transport, Dept. National Health and Welfare, Dept. of Industry, Trade & Commerce, the R.C.M.P., Game Branch, N.W.T., Northern Canada Power Commission, Northern Transportation Co., Dept. Indian Affairs & Northern Development.

Particular thanks are due W.L. Wallace, Dept. Forestry & Rural Development; F. Nowosad (deceased) and J.H. Day, Research Branch, Dept. Agriculture and S.A. Kanik, Oil & Gas Administration, D.I.A.N.D.

#### Abbreviations Used in the Text

|            |   |
|------------|---|
| D.I.A.N.D. | Department of Indian Affairs & Northern Development |
| D.O.T.     | Department of Transport                             |
| D.P.W.     | Department of Public Works                          |
| D.N.H.W.   | Department of Northern Health and Welfare           |
| N.C.P.C.   | Northern Canada Power Commission                    |
| N.T.C.     | Northern Transportation Company Limited             |
| G.S.C.     | Geological Survey of Canada                         |
| R.C.M.P.   | Royal Canadian Mounted Police                       |
| N.W.T.     | Northwest Territories                               |
| B.C.       | British Columbia                                    |
| CNT        | Canadian National Telecommunications                |
| H.B. Co.   | Hudson's Bay Company                                |

## CHAPTER 1

### PHYSICAL ENVIRONMENT

The content of this section is based on Memoir 247 of the G.S.C. by H.S. Bostock: G.S.C. map 30-1963 and G.S.C. papers 60-19, 61-13 and 64-52. Wherever possible the data contained in these publications has been supplemented by data accumulated by the survey through observations made both from the air and the ground during the summer field work.

#### PHYSIOGRAPHY

The Lower Liard Region lies within two major physiographic divisions; namely, the Canadian Cordillera and the Interior Plains. The Canadian Cordillera is amenable to separation into subordinate divisions, and further still into numerous sub-divisions. On the other hand, the Interior Plains in the Lower Liard Region are featureless and not so readily divisible into subordinate physiographic units. The major physiographic elements in the region are shown on map 2.

#### Lower Liard Region - Cordillera

This part of the study area lies in the Eastern System of the Canadian Cordillera, except for a section along the Yukon-N.W.T. border which Bostock places in the Interior System. Included in the latter system are the Selwyn Mountains which form the divide between the South Nahanni and Upper Liard river basins, and along which the border is located. The Selwyn Mountains undergo a three-fold division designated Wernecke, Hess and Logan Mts. In the Lower Liard Region the Selwyn Mts. have a general elevation of approximately 7,000' with a few of the peaks reaching elevations over 9,000'. Many of the peaks are capped with glaciers.

Bordering the Selwyn Mts. to the West are the Mackenzie Mts. These are divided into the Backbone and Canyon Ranges. The southern extremity of the Canyon Range is pronounced in the canyons of the South Nahanni River where flat to nearly flat lying strata are in evidence over considerable distances. A distinct change occurs when passing from the Selwyn Mountains and Backbone Ranges into the Canyon Ranges. This is not only a feature of decreasing elevation when progressing easterly but also one of decreasing ruggedness and apparent tectonic disturbance.

The Backbone Ranges have a few elevations up to 8,000' but for the most part these are in the order of 7,000'. The general elevation of the ranges is probably 5,500'. The Canyon Ranges have some peaks slightly over 6,000' but they are few. The general elevation of the ranges is apt to be 4,000'.



The Franklin Mountains bordering the Interior Plain form the easterly limit of the Canadian Cordillera as represented in the Lower Liard Region. These Mountains are represented in the Lower Liard Region by three ranges. The most northerly of these is the Camsell and the most southerly the Liard. The mid area is occupied by the Nahanni Range whose southern feature is Nahanni Butte with an elevation of roughly 4,700'. These ranges have a width of about 12 miles and a length of about 50 miles. The highest elevation is in the Nahanni Range at 5,080'.

Parts of two Plateaux are identified in the study area by Bostock. These are the Hyland and the Liard. Both are located in the south of the Lower Liard Region and mark the southerly limit of the Selwyn and Mackenzie Mountains. The Hyland Plateau has a general elevation somewhat less than 400'. Bostock (1965 : p. 51) notes similarities in elevation between the Hyland and Liard Plateaux and the continuity of their surfaces. However, certain discernible characteristics in the Hyland Plateau places it in the Interior System along with the Selwyn Mts., and the Liard Plateau in the Eastern System with the Mackenzie Mts.

The last large physiographic feature is the Mackenzie Plain of the Eastern System. The plain is a broad valley separating the Camsell, Nahanni and Liard Frontal Ranges from the Mackenzie Mts. Due west from Fort Simpson the plain is about 30 miles in width. The Nahanni Range is breached both at Cli and Little Doctor Lakes giving rise to passes into the Mackenzie Plain (Plate 1). The natural entrances to it however are via the Ram or South Nahanni Rivers. There is little foothills development in the Lower Liard Region as may be found in front of the Rocky Mts. in Alberta. The mountain ranges of the Eastern System rise abruptly along the western margin of the Interior Plain



Plate 1 - View looking east from the Mackenzie Plain to the Interior Plains through the pass in the Nahanni Range at Little Doctor Lake.



## LOWER LIARD REGION - INTERIOR PLAINS

The eastern part of the region is contained within the Interior Plains. When observed from the air the plain appears virtually featureless and flat. This is partially illusory due to the sharp contrast between the subdued topography of the plain and the rugged topography of the frontal and other ranges of the cordillera. From the air all of this is visible at a glance.



Plate 2 - The western boundary of the Interior Plains.  
The Nahanni Range rises in the foreground.  
The higher Canyon and Backbone Ranges are  
just visible in the distance.

That part of the Interior Plains in the study area may be likened to a shallow inverted saucer exhibiting nearly radial drainage. The plain is deeply dissected by many of the streams where they leave the plain elevation and enter the valley depressions of the Liard and Mackenzie Rivers. Several of these have developed true canyons, the most notable of which is the Trout River below Whittaker Falls. Trout Lake, the largest in the Lower Liard Region, occupies a slightly elevated depression in the plain. Some prominent hills are located at the south end of the Lake. These have an elevation of roughly 2,000' ASL and a local elevation of approximately 500'.

The hills just described are the most prominent on this particular part of the plain until Horn Mountain and its associated hills are encountered north of the Mackenzie River.

At Fort Liard a south-easterly trending range of hills rise on the plain and pass into B.C. Their prominence and expression is similar to the hills near Trout Lake to the north. To the east the plain is for the most part unbroken far beyond the limits of the Lower Liard Region, as defined in this report.

## GENERAL GEOLOGY

The Geological Survey of Canada undertook exploratory work in the Lower Liard Region in 1887 when R.G. McConnell travelled from Lower Post B.C. to Fort Simpson via the Liard River. From there he worked up the Mackenzie River to Fort Providence where he spent the winter. The following year he descended the Mackenzie River to the Peel River and thence into the Yukon.

The most recent geological mapping by the G.S.C. is contained in Papers 59-6; 60-19; 61-13 and 64-52. Detailed mapping of mineralized localities has been carried-out by mining interests in a number of locations in the Lower Liard Region. As well, much information relating to sub-surface geology has resulted from the efforts of private companies engaged in the exploration and drilling for gas which began in recent times as an extension of similar activity in northern British Columbia.

The economic survey report concerns itself with a very brief description of the general geology based largely on the G.S.C. Papers mentioned above. It draws also on Economic Geology Series No. 1 (G.S.C. 1963) and G.S.C. Map 30-1963. Observations made during the field season are included wherever they add to an easier understanding of the geological setting. Companion Map 3 illustrates the general geology.

## SEDIMENTARY GEOLOGY

Virtually the entire Region is underlain by sedimentary rocks ranging in age from Precambrian through Upper Cretaceous. The only igneous rocks exposed are located in the Selwyn Mountains close to the Yukon border area. The sedimentary mantle is thinnest where it overlaps the Precambrian Shield along the eastern edge of the Interior Plains, and reaches its greatest thickness in the Cordillera to the west.

The youngest formations identified in the region are of Upper Cretaceous age. The northwest trending hills south of Trout Lake; certain elevations between Sibbeston Lake and Fort Simpson, along with Horn Mountains and its associated hills, consist of Cretaceous formations. So, also, does the range of hills trending southeast from Fort Liard into B.C.

The oldest formations are of Precambrian-Cambrian age and are undivided. Exposures of this group are confined almost entirely to the Selwyn Mts. The oldest exposed rocks, also of Cambrian Age, in the Interior Plains section occur in a small outcrop at the base of the Nahanni Range, due east of Sibbeston Lake. These are brought to the surface by the Nahanni Thrust which gave rise to the range of the same name.

Between the earliest and latest formations identified in the region rests a stratigraphic sequence of considerable thickness and lateral extent. Economic Geology Series No. 1 (G.S.C. 1963 : p. 251) suggests that the Pre-



cambrian basement-complex slopes gently toward the Cordillera under the Interior Plains. The thickness of the overlying sedimentary mantle of Paleozoic and later rocks near the western edge of the Interior Plains is stated as being in the general order of 10,000 feet.

From the western fringe of the Interior Plains westerly into the Cordillera the Paleozoic and later sediments undergo a pronounced thickening. Gabrielse, Roddick & Blusson (G. S. C. 1965: p 4-5) in their study of parts of the Mackenzie and Logan Mts. , and also parts of the Hyland and Liard Plateaux, give a thickness of between 26,000 and 47,000 feet from the Precambrian through Middle Devonian. In excess of 20,000 feet of Proterozoic sediments underlies the Paleozoic. These thicknesses are indicative of the existence of a great depression to the west of the Interior Plains prior to mountain building.

The principal unconformity in the region is at the base of the Paleozoic, although in all locations this is not always clearly discernible. For example, thicknesses noted in the previous paragraph include a measurement of 7,000 feet of sediments concluded to be undifferentiated strata of Cambrian and Precambrian age in which the unconformity could not be placed. Some fifty miles to the south of the localities in which these measurements were taken, Douglas and Norris (G. S. C. 1959: p 5-6) indicate between 22,000 and 30,000 feet of Paleozoic and later sediments in which the oldest identifiable units are of Middle Devonian age. Cambrian and Ordovician strata appear to be missing altogether. Unconformities are also indicated at the base of the Permian and the Lower Cretaceous as well.

Other discontinuities in the sedimentary sequence occur in the region and lend support to the suggestion in Economic Geology No. 1 (G. S. C. p.264) that the great basin was subject to periods of uplift and depression in different areas at different times. The location and extent of Devonian beds deposited during periods of deposition is of particular importance because their more porous horizons are known to serve as reservoir rocks for natural gas.

### Structure & Lithology

The major structural characteristics in the Lower Liard Region resolve themselves into a large basin structure underlying the plains and Cordillera provinces; folding and thrust-faulting along general northwest/north-south axes in the Cordillera. Flat to nearly flat lying strata underlie the breadth of the Interior Plains. This of course is a highly over-simplified interpretation of a very complex structural setting much beyond the scope of the present report. However a brief discussion of the broader features would be useful.

On the whole, folding in the Cordillera represented within the Lower Liard Region is gentle but can be very tight locally and further complicated by frequent thrust faults. Recumbent folds are not uncommon in the Backbone Range below Flat River.

The broadest folds appear in the Canyon Ranges and are clearly visible from the air. Crests of anticlines are most in evidence but the continuity of these with complementary synclinal structures is generally obliterated by thrust faulting. Twisted Mountain (Plate 3), although tight by comparison with those mentioned above, is an example of an asymmetrical anticlinal fold faulted along the base of its east limb. On the west side of the fault the strata are nearly vertical in attitude, while on the west side they dip only gently to the east.



Plate 3 - View of Twisted Mountain from the South Nahanni River. The west limb of the anticlinal structure is on the left. The fault cuts through half-way between the crest of the anticline and the right margin of the photo.

An aerial traverse of the Eastern Cordillera indicates that, generally speaking, the predominant direction of dip of thrust planes is westerly, resulting in a large number of up-lifted formations being open-faced to the east. Douglas & Norris (G.S.C. 1960: p.25), however, have noted that in some areas of their study major thrust planes dipped either east or west.

These same authors note that the physiographic boundary between the western edge of the Interior Plains is not coincident with structural elements of the Eastern Cordillera but extend under the plain. This is especially so at Fort Liard and to the south-east, but flat or nearly flat lying strata at widely separated points such as on the Liard between Fort Simpson and Nahanni Butte, (Plate 4); the upper reaches of the Arrowhead and Muskeg Rivers; the canyon below Hittaker Falls and in the vicinity of Trout Lake attest generally to the horizontal attitude of formations underlying the Interior Plains in the study region.





Plate 4 - Flat-lying Devonian shales exposed along the right bank of the Liard River 40 miles above Fort Simpson. Photo looking east.

Most common sedimentary rock types are found in the lithology of the Lower Liard Region. Due to structural considerations, the greatest variety of types is found in the mountainous areas where extensive stratigraphic sequences are exposed in open faces and outcroppings are widespread. On the whole, limestones and dolomites predominate. They range in colour from light grey, buff, medium grey to black. Shale is commonly present. Sandstones, siltstone and shale are more in evidence in post-Devonian periods. Facies changes have been postulated throughout the region.

The Interior Plains area within the region presents for the most part its Upper Cretaceous face at the surface. The most common rock types therefore consist of sandstones and shales. Devonian shales are encountered in deeply dissected parts of the plains, and deep drilling has proved the continuation of Devonian limestones and dolomites under the plains. Outcroppings are relatively scarce in the plains area.

### IGNEOUS GEOLOGY

Igneous rocks in the region are intrusive; with the exception of minor extrusives noted by Gabrielse, Roddick & Blusson (G.S.C. 1965:p4) in the Middle Devonian. The intrusives, consisting of quartz monzonite, granodiorite, diorite and minor granite, are placed in the Cretaceous by all observers. The area in which these are exposed is confined to the vicinity of the Flat River, between the South Nahanni River and the Yukon border. The mode of their occurrence is in large and small stocks, some of which outcrop in the vicinity of Canada Tungsten Mine at Tungsten. The rock-types and age of

the intrusives correspond to extensive exposures of similar rocks in the Pacific ranges of the Cordillera.

It is very probable that numerous intrusive bodies lie close to the surface in other parts of the Cordillera in the region and may be associated with the mineralization occurring in widely separated localities.

### SURFICIAL GEOLOGY

All superficial deposits in the Region are transported and have resulted from the actions of ice and water. Most of the region has been glaciated at one time or another and its effects have left a cover of unconsolidated material blanketed over the Interior Plains. Clays, sands and tills make up the cover material. Cover depth is variable, ranging from deep over depressions in the underlying strata to a few inches where strata are near the surface. The glacial materials are, in turn, covered by a superficial layer of vegetal matter and muck. These factors and the structural aspects of the plains conspire to produce a poorly drained area spotted with shallow ponds and vast areas of muskeg.



Plate 5 - A poorly-drained area of the Interior Plains between Fort Simpson and Trout Lake. Haze is created by southerly drifting smoke from brush fires burning near Inuvik in August, 1968.

The Mackenzie, Liard and South Nahanni Rivers all have flood plains resulting in the superposition of alluvium on glacial cover in topographically favourable locations. The flood plains are being constantly recut and reworked by the parent rivers. A study of mosaics in the vicinity of Nahanni Butte shows the courses of the Liard and South Nahanni Rivers have swung by several miles



over their own flood-plains in recent geological times. The resultant alluvial soils range through silts, sands and clays, with minor gravels in the form of buried bars. In places along the rivers the separation between river and glacial deposition is clearly seen.

The Cordillera has been subjected to extensive mountain and valley glaciation. This action has resulted in the deposition of considerable materials in the open valleys in that particular area. Deadman Valley on the South Nahanni River contains thick deposits of till and finer stratified materials resulting from the action of ice and water. Lower down the South Nahanni River are several hills composed entirely of gravels.

Boulders examined along the South Nahanni were indicative of the surrounding rocks, and the few igneous boulders found on the lower Flat River were probably derived from the Cretaceous intrusives higher up the valley. This is indicative of localized glacial activity. By contrast, boulders found over the full extent of the Liard and Mackenzie Rivers in the survey region are predominantly igneous and occur in great variety. These could only have originated in the Precambrian Shield and confirm a generally westerly movement of the last ice-sheet at least to the east edge of the Cordillera.

J.H. Day, Canada Department of Agriculture, 1966, completed comprehensive reconnaissance soils surveys of the Liard and Mackenzie Valleys in the Lower Liard Region and provided a general assessment of their potential for agriculture.

### GENERAL HYDROLOGY

Parts of three important drainage basins are represented in the Lower Liard Region. In order of importance these are: Mackenzie, Liard and South Nahanni. Smaller basins are numerous in the area but are not considered in this report. Map 4 shows the principal river basins.

#### MACKENZIE RIVER BASIN

The Mackenzie River skirts the Lower Liard Region on its northern fringe. Its width just below Fort Simpson, and also just above Martin Island, is one and one half miles. Near Strong Point it is one mile wide. In front of Jean Marie its width is reduced to about one half mile, and over its length between Forts Simpson and Providence is probably in the order of one half mile or less. The river shoals in many places give rise to rapids or "fast water". For the most part however the channel probably contains sixteen feet or more water during low-water periods. Brandon (1965 p. 35) notes that the Mackenzie courses 915 miles between the west end of Great Slave Lake and the Mackenzie Delta and has a fall of 510 feet over that distance.

## LIARD RIVER BASIN

The Liard River is a large tributary river in the Mackenzie system and its catchment basin drains just about all of the Lower Liard Region as defined in this report. The river rises in Yukon Territory to the east of Whitehorse, courses south-easterly into northern B.C. where it is joined by the Nelson River between Forts Nelson and Liard. From there its course is generally north to where it joins the Mackenzie River at Fort Simpson, N.W.T. The distance involved is approximately 700 miles. Between Nelson Forks, B.C. and Fort Simpson, a river-course distance of roughly 300 miles, the fall is 625'.

The catchment area of the Liard River basin in N.W.T. is roughly 11,000 square miles. Over its course the Liard collects drainage from the south slopes of the Simpson Range in the Pelly Mountains, traverses and drains the Liard Plain and drains most of the Hyland and Liard Plateaux. To this is added the water from the Nelson catchment which drains the Rocky Mountain foothills and the western part of the Interior Plains in northern B.C. The Liard receives considerable drainage directly from the Interior Plains, north from the B.C. border as far as Fort Simpson. This is further augmented by the substantial drainage from the South Nahanni River Basin.

## SOUTH NAHANNI RIVER BASIN

The last basin to be discussed by the report is that of the South Nahanni River which joins the Liard at Nahanni Butte. The South Nahanni rises near Christie Pass in the Selwyn Mountains, close to the Yukon-N.W.T. border. Its length is roughly 350 miles and the catchment area is approximately 16,000 square miles. The principal tributary is the Flat River. Their confluence is about 20 miles below Virginia Falls. Chin (1962: p.2) states that over the 125 mile course between the Falls and Nahanni Butte, the drop in the river is 1,260'; 400' of which is accounted for by the Falls themselves.

The river drains the south parts of the Selwyn Mts., then cuts through the Backbone and Canyon Ranges of the Mackenzie Mts. almost at right angles to their north-south trend. Drainage is also collected from the northern extension of the Hyland and Liard Plateaus, and from some areas of the Liard and Nahanni Ranges, before the South Nahanni joins the Liard River at Nahanni Butte.

For a considerable distance above Virginia Falls the Nahanni River is not swift, has a pronounced meander development and flows in a broad valley having characteristics of maturity. Below the Falls however the valley is young as evidenced by the very active down-cutting of the river. For its size, the river is extraordinarily and consistently swift over most of its length.



The river carries a very substantial load of material in suspension. Most of it is collected from the alluvial valleys such as Deadmen and others. Being composed chiefly of silts, fine sands and minor clays, river banks in certain of these locations are very unstable and are given to caving and slumping. Usually when this occurs all vegetative cover, regardless of size, will be carried away by the swift action of the river. Eventually the river bank will again reach its maximum angle of repose and the process is repeated. Plate 6 illustrates this chief source of suspended material in the South Nahanni River. Similar conditions exist along the Liard River, but to a lesser extent along the Mackenzie.



Plate 6 - Caving and slumping of river banks in Deadman Valley, South Nahanni River. Some spruce in the background are over 70' in height.

### RIVER DISCHARGE

Streamflow recording stations have been installed in the Lower Liard Region at the sites indicated on map 4. None has been installed a sufficient length of time for the establishment of flow data over a long period of time. The gauges in the South Nahanni River basin were installed in 1960; the recording gauge at Fort Liard was installed only recently and replaced a manual gauge. The manual gauge at Fort Providence was replaced in 1963 and miscellaneous data are available for earlier periods. A recording gauge was installed at Fort Simpson in 1961 but has not operated continuously since that time.

The flow data given in the following table are indicative only and are included to convey some appreciation of the magnitude of flow or discharge in these rivers.

TABLE 1

RIVER DISCHARGES IN CUBIC FEET PER SECOND

| RIVER<br>&<br>GAUGING STN. | MEAN<br>ANNUAL<br>DISCHARGE | MAXIMUM<br>DAILY<br>DISCHARGE | MINIMUM<br>DAILY<br>DISCHARGE | YEAR |
|----------------------------|-----------------------------|-------------------------------|-------------------------------|------|
| <u>MACKENZIE RIVER</u>     |                             |                               |                               |      |
| Fort Providence            | 297,000                     | (9 July & 14 Aug.)<br>312,000 | (15 Apr.)<br>66,300           | 1964 |
| Fort Simpson               | -                           | (May 1961)<br>830,000         | (Mar. 1961)<br>66,300         | 1964 |
| <u>SOUTH NAHANNI RIVER</u> |                             |                               |                               |      |
| Clausen Creek              | 17,400                      | (6 June)<br>99,700            | (1 Apr. -12 May)<br>2,900     | 1964 |
| Flat River                 | 4,000                       | (4 June)<br>26,200            | (1 Feb. -30 Apr.)<br>700      | 1964 |
| Virginia Falls             | 8,230                       | (13 June)<br>60,100           | (1 Jan. -5 May)<br>1,100      | 1964 |
| <u>LIARD RIVER</u>         |                             |                               |                               |      |
| Fort Liard                 | 88,000                      | (11 June)<br>403,000          | (1-20 Apr.)<br>13,000         | 1964 |
| -----                      |                             |                               |                               |      |
| <u>NIAGARA RIVER</u>       |                             |                               |                               |      |
| Queenston                  | 162,500                     | (19 May)<br>196,200           | (13 Jan.)<br>96,200           | 1964 |

Data Source: Dept. Energy, Mines & Resources, Water Resources Branch

Only about two months of recording were done at Fort Simpson in the water year 1964 so comparable data are not available. However, a tally of Fort Providence, Clausen Creek and Fort Liard readings gives a total of 402,400 cfs. at Fort Simpson. To this would have to be added the discharge of the Trout River, and a number of sizeable streams which are not gauged. It is probable therefore that the mean annual discharge at Fort Simpson for the water year 1964 would have recorded in the order of 425,000 cfs., or nearly three times that of the Niagara River at Queenston for the same year.

## RIVER LEVELS

These are related to the recharge and discharge cycle in the region. River levels are actually at their lowest when ice has reached its maximum thickness. Recharge of the rivers during this period is chiefly from ground-water and lake storage because surface run-off is virtually halted.

Rivers reach their highest levels during and following break-up in May when rivers are in full spate. In this regard the timing of break-up of the several rivers can have serious consequences for settlements not particularly well located. Fort Simpson is perhaps the best example anywhere. The South Nahanni will generally break-up before or at the same time as the Liard, and both commonly break-up before the Mackenzie. This can give rise to serious ice-jams and consequently high water levels at Fort Simpson such as the one in 1963 which nearly flooded the entire island on which the settlement is situated.

Following break-up the river levels recede but are subject again to intermittent flooding of a lesser degree during the summer due to melting snows and ice in the upper reaches of the basins. In June and July water levels can rise and fall several feet in a short time. This is generally not serious but does create a hazard for small boats because of the greatly increased velocity of the current and the large amount of suspended debris resulting from accelerated erosion of the river banks.

The lowest river levels during the open water period are from about mid-August onward, but unusual precipitation in the basins during late summer can give rise to high water for brief periods.

## GROUND-WATER

Ground-water resources in the region can be expected to be fairly good in the Interior Plains area because it possesses much alluvial and till cover. Alluvial valleys in the Cordillera are not so promising. Due chiefly to the more widespread effects of permafrost on ground-water storage and movement.

The settlements, with the exception of Trout Lake, all have wells. These are shallow dug wells. Some of them, a few at Fort Simpson and one at Nahanni Butte, are located in that part of the water-table affected by the river and their respective water levels fluctuate accordingly. Other wells, although located close to rivers, are unaffected by fluctuating levels due to the geology and composition of the soil mantle.

The wells in the area can vary considerably in depth depending upon the elevation of the site above the river, composition of the aquifer, distance from the river, etc. The shallowest wells are in Jean Marie. Brandon (1965: p. 79) mentions one with a depth of 14'. The bottom of this well is well above the



river level and is unaffected by its fluctuations. The deepest noted by Brandon was at Fort Simpson with a depth of 48'. Some of the wells at Simpson are known to be saline.

The region is within the fringe zone of the permafrost belt, and is therefore spotty at lower elevations. Wells are usually dug in open locations, and, if little or no permafrost is encountered during their construction, they can be relied upon the year round with normal precautions.

### Thermal Springs

Two thermal-spring zones have been located in the area. One of these occurs just below Tungsten near the Flat River and was not observed during the field season. The best known occurrence is known as "Hot Springs" located on the right bank of the South Nahanni River about 40 miles above Nahanni Butte, by the river. The latter occurrence will be discussed in detail elsewhere in the report.

Brandon (1965: p. 58) concludes that surface water percolates into sedimentary strata higher in the Nahanni Plateau and may reach a depth of 5000' before reaching its point of natural discharge at Hot Springs. The increase in water temperature may be from chemical reaction.

The springs, for the most part, are contained in man-made pools by excavation and damming with the overflow going directly into the South Nahanni River. However, seepages can be found everywhere, including the opposite or left bank of the river. The springs have a pronounced hydrogen-sulphide odor.

Brandon (1965: p. 58) estimated the flow of water from the main pool, (plate 21) to be approximately 300 gallons per minute. Mr. G. Kraus informed the author that he had recorded the water temperature of the main pool fairly continuously and that for all months except March the temperature was constant at 98 degrees Fahrenheit. In March the temperature consistently rose to 104 degrees.

## CLIMATE

The Lower Liard Region falls into the sub-arctic climatic region and comparatively speaking is subject to long cold winters and short cool summers. The physiography of the region demonstrates the great topographic dissimilarity between the two major divisions, i. e., Interior Plains and Cordillera. Local weather recording stations are all located in the Interior Plains area giving rise to a lack of continuous or even sporadic weather data for the Cordillera. This section therefore is limited to the presentation of data relevant only to the Interior Plains, while not ignoring the importance that weather recording in the Cordillera could play in the future development of mineral and other resources.



Three weather recording stations are located on the fringes of the study region, these are Fort Simpson in the north, Fort Providence in the north-east and Fort Nelson, B. C. , to the south. Table 2 summarizes a few of the principal data from the three stations and includes, as well, similar data from two, other Interior Plains stations as useful comparisons. These are: Fort McPherson roughly 600 miles north-west of the study region and Calgary approximately the same distance south-east of the region. It is realized that a host of technical factors could be amassed to invalidate a comparison of this kind between such widely separated localities, but to include them may make it easier for some to grasp the climatic environment in the lower parts of the region.

### TEMPERATURE

The long-term monthly averages of temperature range between  $55^{\circ}$  and  $62^{\circ}$  F for the summer months of June, July and August, while during the winter months November through February they range between  $-17^{\circ}$  and  $11^{\circ}$  have been recorded. Short periods of extreme cold in the winter and great warmth in the summer are experienced. Extremes of  $-66^{\circ}$  and  $98^{\circ}$  have been recorded.

### PRECIPITATION

Precipitation in the region is low. The total annual amount ranges between 9.6 and 16.4 inches. A definite decrease in precipitation occurs from the south to the north and north-east. The differential between Fort Nelson and Fort Simpson is about 4.3 inches, and at Fort Providence it is about 6.8 inches. The average annual snow-fall is between 45.2 and 66.8 inches. The water equivalent of this fall is computed at 10% and is included in the total precipitation range given earlier. The months of greatest snowfall and rainfall are, respectively, November and June/July. Snowfalls have been recorded in every month September through May and rainfalls in every month March through October.

As a rule, the plains area is free of snow in May but it may be retained for a longer period in some shaded gullies. In the Cordillera snow has generally disappeared from all but the higher elevations by mid-June. A concentration of snow and ice was observed at the mouth of Prairie Creek during field-work, but it was not seen elsewhere at correspondingly low levels in the Cordillera.

TABLE 2

| Station         | Mean<br>Temperature<br>in F. | Total<br>Precipitation<br>in inches | Frost Free<br>Period<br>In Days Above 32°F. | Growing<br>Period<br>In Days Above 42°F. |
|-----------------|------------------------------|-------------------------------------|---|--|
| Fort Simpson    | 25                           | 12                                  | 90  | 138                                      |
| Fort Providence | 25                           | 9.6                                 | 79  | 135                                      |
| Fort Liard (P)  | 27                           | 14                                  | 95  | 148                                      |
| Fort Nelson     | 30                           | 16.4                                | 101   | 156                                      |
| Fort McPherson  | 17                           | 10                                  | -   | 110                                      |
| Calgary         | 39                           | 17.5                                | 110   | 172                                      |

Data Sources: Department of Transport Meteorological Publications, Department of Agriculture Agrometeorology Section.

Notes: Mean Temperature - Annual Average Daily Mean Temperature

Total Precipitation - Rainfall plus one tenth snowfall

Fort Liard (P) - No Station, data postulated using Forts Liard and Nelson for reference.

Growing Period - Based on estimated only.

#### FREEZE-UP & BREAK-UP

The larger rivers in the region do not freeze-up or break-up at precisely the same times at separated localities. Many factors enter into this aspect of these annual events but the most important is the velocity of the current at the localities concerned.

Table 3 is introduced to illustrate the relationship between ice dates at certain selected points within and without the study area. Those data pertinent to Hay River, Fort Providence and Fort Nelson are included because of their importance to the commencement and termination of river barging seasons which affect supply in the Lower Liard Region.

TABLE 3DATES OF FREEZE-UP & BREAK-UP

| Location        | Break-up |         | Freeze-up |         |           |
|-----------------|----------|---------|-----------|---------|-----------|
|                 | Earliest | Latest  | Earliest  | Latest  | Period    |
| Fort Nelson     | 22 Apr.  | 10 May  | 2 Nov.    | 20 Nov. | 1958-1967 |
| Fort Liard      | 27 Apr.  | 16 May  | 3 Nov.    | 26 Nov. | 1958-1967 |
| Fort Simpson    | 6 May    | 31 May  | 2 Nov.    | 1 Dec.  | 1958-1967 |
| Fort Providence | 18 May   | 19 June | 29 Nov.   | 31 Jan. | 1956-1961 |

Data Source: Meteorological Branch, D. O. T., Catholic Mission, Fort Liard

In the above table "break-up" is the date on which a river is clear of ice, and "freeze-up" is synonymous with "freeze-over". Generally speaking, the rivers concerned are impassable to vessels shortly before permanent ice begins to form, which is usually two to three weeks preceeding freeze-up. In 1967, for example, the shipping season on the Mackenzie closed on 15 October, a scant three days before permanent ice began to form at Fort Simpson on 18 October.

PERMAFROST

According to N. R. C. (1967 - map & marginal notes) the study region lies almost wholly within the southern fringe zone of the permafrost region. Its border with the zone of widespread permafrost passes east-west through Fort Simpson.

The active permafrost zone at Fort Simpson is placed at some forty feet thick, commencing several feet below the surface. However, dug wells and excavations have shown the layer to be discontinuous and patchy. Experience at the Experimental Farm, Fort Simpson, has shown that working of the ground will cause the upper limits of the active zone to recede substantially.

Permafrost is encountered only occasionally at Nahanni Butte. During the summer of 1968 two garbage pits were sunk to a depth of 12 feet and encountered no permafrost whatever.

At Fort Liard, permafrost presents no problems and no difficulties were encountered in the digging of wells.

Apart from the critical ground/air temperature conditions necessary for sustained permafrost conditions, ground cover and elevation are important local considerations. What has been said in previous paragraphs about the occurrence of permafrost conditions related to the Interior Plains physiographic



province and, further, to ground that had been stripped of major vegetation. Areas with a heavy vegetative cover of trees, brush and especially mosses will have a higher incidence of permafrost patches situated closer to the surface. However, although the plains area south of the Mackenzie River has an insulating cover of mosses and larger growth, no real difficulties with permafrost were encountered during highway construction. This is probably related in some way to the generally shallow depth of the soils in that part of the region.

Permafrost is a more important factor in the Cordillera where it constitutes a costly hazard to earth-moving projects; particularly road building. Road building projects in the Canyon Ranges, altitude about 4,500', encountered permafrost at the surface. Several weeks following a cleaning-down of the broken surface material the active permafrost surface had barely receded at all.

On the whole, permafrost should not impede developments of all kinds in the plains area of the region but requires consideration at generally higher altitudes and in areas of deep soil and vegetative cover.

### VEGETATION

A vegetative cover exists over the entire Lower Liard Region up to the tree-line; estimated by R. P. Hirvonen (1968: p.1) at approximately 3,800'. The principal vegetative cover consists of trees. The study area belongs in the Boreal Forest Region and is divided by Hirvonen (1968: p.2) into two major divisions, i. e. , predominantly forest, and forest and barren. The forested areas are occupied mainly by stands of spruce and poplar with minor birch.

The most heavily forested areas occur in the valleys of the Liard, Mackenzie and South Nahanni Rivers, and in the valleys of most smaller streams where the moisture regime and soil conditions are most suitable for sustained growth. In the open plains area spruce predominate, but are relatively stunted and grow in scattered stands. The balance of vegetative cover in the plains is confined to swamp grasses, shrubs and mosses. Above the tree-line mosses and short grasses are plentiful but patchy.

Soils in the alluvial areas once cleared of tree-cover, and kept cleared, give rise to a heavy growth of grasses. If unmaintained, in this respect, the fast growing poplars soon take over and provide a dense cover. As a rule, poplar is also the first species to grow following burns.

J. H. Day (1966: p.13-13) provides a table for certain dominant vegetation types and relates these to landforms. For convenience these are reprinted in the report and appear in Appendix 1.

## SITES

A brief outline of sites concludes the chapter on the physical environment. Few undertakings can be more important to a developing region than the placement of intelligently selected sites on which settlements are to grow.

The Northwest Territories, unfortunately, has been left with a legacy of sites whose original selection was guided by the need to locate more or less centrally to a widely dispersed native population engaged in fur harvesting, and also to river-supply routes. It is a stroke of good luck if any of the older sites should happen to be ideally located with respect to the principal parameters of site selection applicable in today's circumstances.

Some sites have been perpetuated long beyond the time when they should have been exchanged for something better, while for others still only a quite recent definition of resources and communication systems has brought to light their unfavourability as sites amenable to socio-economic development.

Any criticism of sites raises the spectre of re-location, and in turn, the prospects of unwanted expense, social upheaval and perhaps political upheaval as well, whether or not some of these be real or imagined. In many cases these prospects are sufficient to thwart the act of re-location itself, regardless of how strong the proof for relocation may be.

The balance of this section is devoted to outlining a few of the characteristics of each site in the Lower Liard Region. The chapters on "communication systems" and "natural Resources" which follow will serve to place existing sites in perspective in terms of these parameters.

### TUNGSTEN

Tungsten is an example of strategic site selection in relation to an exploitable resource. The site is serviced by an all-weather road, is well drained and has an adequate source of water nearby (Plate 17).

Better sites could be found but would be less efficient in the purpose they were supposed to serve. The Tungsten site is a good compromise of the requirements to economically extract and process a natural resource and at the same time to provide a healthy environment for the labour force.

### FORT LIARD

As by a stroke of good fortune, Fort Liard alone of the remaining sites is undoubtedly superior both in terms of location and physical characteristics as well.

It is exceptionally well-located in respect to natural resources of large potential, and is equally well-located relative to the intentioned expansion of communication systems.

The site is situated on the right bank of the Liard River at a point where its course is straight. The underlying soils are of alluvial origin but may be glacial in part. They consist of sands, silts and minor clays. There has been a senseless destruction of tree-growth along the river bank fronting on the Liard, but because of the naturally stable nature of the banks and the straight course of the river, bank erosion is virtually negligible.

Potable water is obtainable from certain aquifers in the sub-strata below the site and appears to be abundant. Apart from this, and other attributes mentioned in the preceding paragraphs, the site offers room for unlimited expansion to the east on land that rises gradually in that direction.

### NAHANNI BUTTE

This site, although of quite recent origin, was poorly selected with respect to nearly all the parameters pertaining to location. Its one saving grace perhaps is that considering its present stage of development it could be re-located with a very minimum of upset.

The site is located on the convex bank of a curve in the course of the South Nahanni River about one mile above where it joins the Liard. It is located in a resource-rich area but is disadvantageously located with regard to proposed road systems which are to be routed on the east side of the Liard River.

The Nahanni site is situated on a broad part of the Liard flood-plain and is underlain by a succession of fine sands and silts with some gravels at depth. The river banks are unstable and this combines with the configuration of the river at this location to produce a condition of rapid bank erosion. The response of the upper stratum of silts when wet is to produce a "gumbo" which seriously interferes with the use of landing-strips and roads.

There is much room for site expansion on the flood-plain but sites so placed might expect to be subject to the conditions that generally prevail on the Liard flood-plain. Whatever the advantages of the present site, it is a certainty that they can be duplicated and greatly augmented to the benefit of population and Government alike at potential sites in the vicinity of the South Nahanni and Liard confluence, on the east side of the Liard River.

### TROUT LAKE

The site at Trout Lake is completely isolated and can only be reached with difficulty, even with aircraft. It is located on the east fringe of known major resources, but is seventy miles from the nearest point on east-west and north-south routes, proposed or presently under construction.

The location is on the south-east shore of Trout Lake at the mouth of Island River. The general elevation of the site is barely a few feet above the lake elevation, but the lake level is relatively constant and does not adversely



affect the site.

The sub-stratum consists of medium-grained sands to an unknown depth. The water table is comparatively near the surface and potable water supplies are good. Drainage on the whole is poor.

### JEAN MARIE

Jean Marie is located on the left bank of the Mackenzie River at the south of the Jean Marie River, about forty miles above Fort Simpson. Major resource areas are located well to the south and south-east, as so far known.

The site is situated about twenty miles from the nearest road-point, i.e., the junction of the Mackenzie Highway Extension and the Fort Simpson turn-off.

The site rests on clays of glacial origin. Drainage is fair but domestic water sources may be open to doubt. Brandon (1965: p. 79) draws attention to this feature of the location.

It is not improbable that the present occupants themselves will chose to re-locate on a site along the highway because it would be better suited to their present sphere of endeavour.

### FORT SIMPSON

In all fairness to Fort Simpson, it has to be said that one would be hard-pressed to find a more unlikely location for a permanent site. It best exemplifies the guidelines for site selection in a bygone era and is the more remarkable because it has been occupied continuously over a period of over 160 years.

The site has a long history of serious flooding so property damage will continue to be a characteristic of the site for a long time to come. Its island location at the junction of two great rivers which served it so well years ago could ultimately destroy any chance of economic viability in the future. It is quite certain that physical expansion on the "safe" part of the island will be curtailed due to the lack of sufficient ground in the very near future.

In relation to major, known resource patterns, the Simpson site is situated well to the north insofar as developments in the Lower Liard Region are concerned. However, resources have not as yet been fully defined and the Simpson site might well find itself in close proximity to hydrocarbon resources. Admitting as much, however, the site would still remain in a disadvantageous location with respect to the likely development of road systems. Placed beside these negative aspects of the site location, other unfavourable characteristics appear rather inconsequential.

It is not at all improbable that the site has passed its peak of importance in the regional scene. It would seem to be much too late to effect a re-location on the scale that would be necessary regarding this site, but it may very well come about through attrition by a voluntary and gradual movement of population to some location along the new highway.

Sites are referred to again in the conclusions and recommendations contained in this report. Map 5 illustrates the site location in respect to current and proposed road construction, while map 7 illustrates resource patterns relative to these same sites.

### SUMMARY

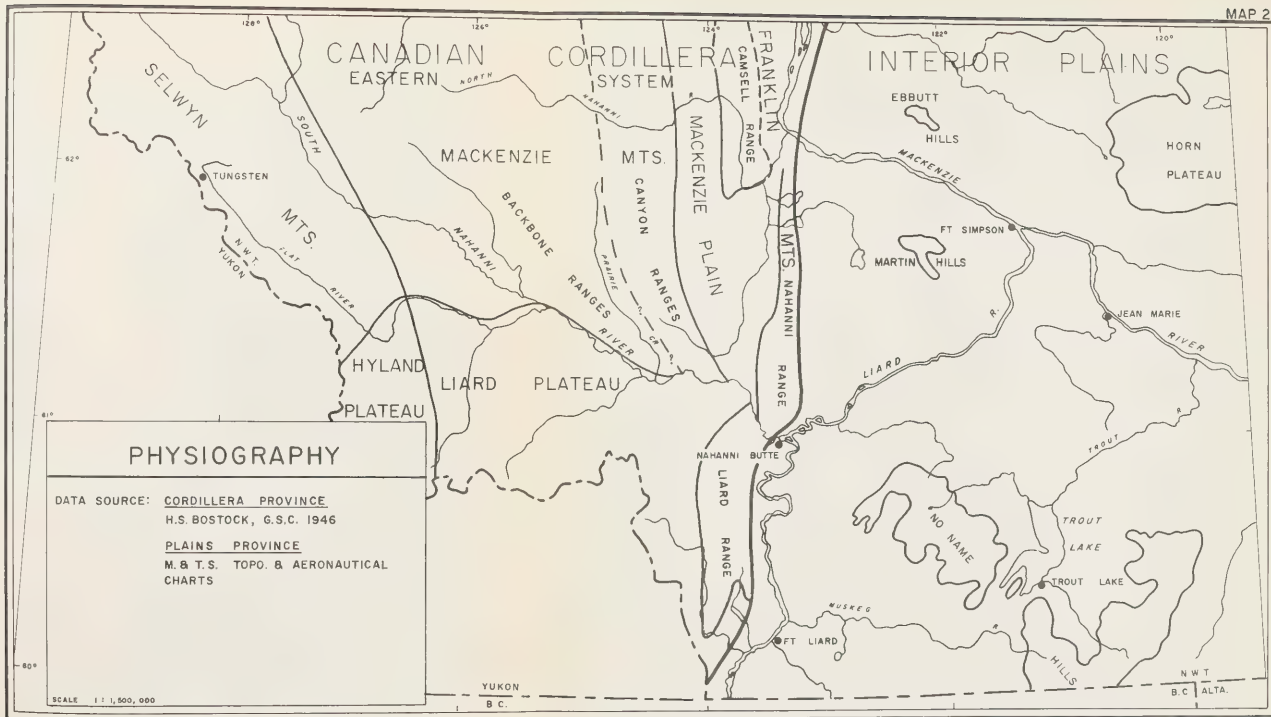
The Lower Liard Region is an area of considerable topographic contrast, being divided almost equally into rugged mountainous terrain in the west and a flat, virtually featureless plains terrain in the east.

The Mackenzie and Liard River systems drain the region. The South Nahanni River is a major tributary of the Liard system and drains most of the mountainous terrain. All the rivers are fast flowing and move considerable volumes of water. Many of the tributary streams of the South Nahanni system are torrential and give rise to enormous fluctuations in the level of the main river at different times of the year.

The region is underlain by a great sedimentary basin containing bedded rocks ranging from the Proterozoic to the Mesozoic in age and up to several miles thick. Igneous rocks are exposed in a comparatively limited way only in the Selwyn Mountains.

The climate of the area is sub-arctic and is characterized by long winters and short summers. In spite of this the region supports a varied and widespread vegetative cover, the most important aspect of which is a large boreal forest reputed to be the best in the N.W.T. In addition, the region contains large areas underlain by alluvial soils in the valleys of the major rivers and known to be suitable for agriculture.

With a few exceptions the sites occupied by settlements are disadvantageously located with respect to known resources and certain of the communication systems vital to economic development. Some have been perpetuated long beyond the time when re-location would have seemed a practical long-range solution, while for others the prospects for re-location will never be better.



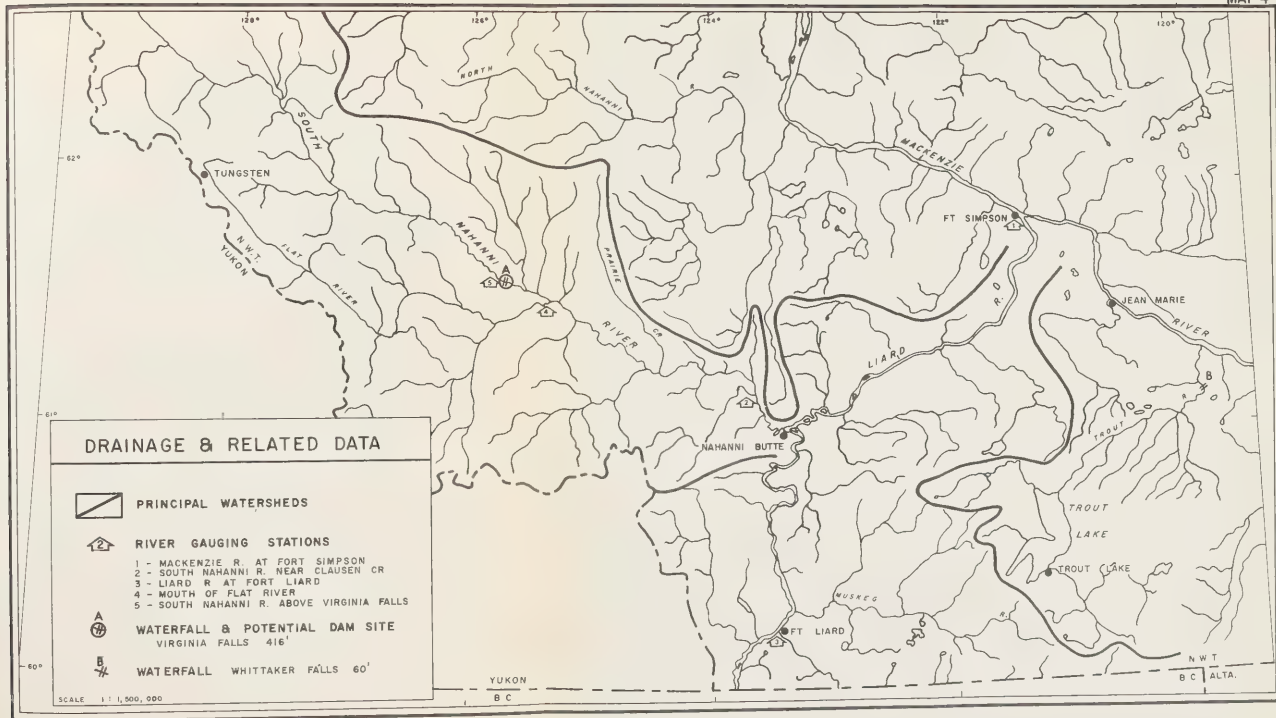














## CHAPTER 2

### COMMUNICATION SYSTEMS

Communication systems enter and leave the Lower Liard Region from two principal directions, i. e. , north-south with Fort Nelson being the seat of influence, and east-west with Hay River being the seat of influence. The greatest development of these systems so far has occurred in the east-west direction parallel to the traditional trade route. It would be well to add, however, that this is unlikely to be the case in the future.

This chapter will discuss the several systems as they exist today and will include also an outline of plans that have been formulated or considered for expanding or otherwise improving communication systems in general. A diagrammatic representation (Fig. 1) of systems as they exist today is included at the end of the chapter. It is hoped that it will illustrate in a better way the influences being exerted on the region in terms of economic pull through communication systems having certain affinities in virtually opposite directions.

### RADIO

Six separate radio networks are established in the region and most of these are subordinate to larger networks outside the region. The nets are evenly split between official and private business. Cross-working is practiced on all networks with the exception of Canadian National Telecommunications which requires all transmissions to be funnelled through toll centres located both at Fort Nelson and Hay River.

#### Mackenzie Forest Service

The Service control station was located at Fort Smith in the summer of 1968 but a move to Yellowknife was anticipated at the end of that year. The radio network within the Lower Liard Region is controlled from Fort Simpson. Its main purpose is for fire control relative to forests, but a certain amount of administrative detail is dealt with as well. Stations included on the net are located at Fort Liard, Nahanni Butte, Jean Marie, Hot Springs and Trout Lake. The latter two stations are privately licensed and should not be classed officially as part of the fire control net. They would as a matter of course report fire information, but their main purpose, due to the remoteness of the locations, is for ordinary outside contact for all of the usual reasons. The frequencies assigned to the official equipment on the net are: 4270, 5730, 1198.5 and 3226.5 KHz. Power output is 50 watts. Scheduled calls are made each day at 1030 and 1600 hours. The station at Fort Liard is responsible for radio communications with the fire tower on Mt. Coty, about seven miles north-east of that settlement. All equipment employs double side-band.



### Royal Canadian Mounted Police

This net is used for voice communications with headquarters at Fort Smith and with detachments at Fort Liard, Fort Providence and other settlements farther removed from the Lower Liard Region. The network is for official police business, but is also used in cases of emergency.

The equipment has the highest output of any in the region, 100 watts, and is assigned the following frequencies: 4455, 4785, 5680 and 7780 KHz. Single side-band operation is employed.

### Catholic Mission

The Catholic Missions at Forts Simpson, Providence and Liard coordinate Church affairs and business by means of a radio net. The net is also tied to the Bishopric of the Mackenzie located at Fort Smith. The equipment employs double side-band operation on the assigned frequency of 4356 KHz. Stations on the net employ double side-band with a power output of 70 watts.

### Department of Transport

The communications, and airports and property management divisions of this Department have a detachment at Fort Simpson to fulfill the responsibilities of the Department in connection with airport facilities. The equipment is generally sophisticated. The radio installation, the most sophisticated in the region, is used for communications between Fort Smith, where the District authority is located, and for the transmitting of landing instructions and weather information to aircraft operating in the vicinity. Other aspects of D.O.T. communications are discussed later in the chapter.

### Canadian National Telecommunications

This company is the only private commercial communications organization established in the Lower Liard Region. It is responsible for the radio communications nets over which all private business is transacted, and is likely to be responsible for expanded and improved systems required in the future. Direct radio communication with all outside points is available from Fort Liard and Nahanni Butte via either Fort Nelson, B.C. or via Hay River. Other systems prevail at Fort Simpson and are discussed elsewhere in this chapter. CNT has numerous stations tied to its radio net in the region. In addition to those mentioned at Fort Liard and Nahanni Butte, there are stations at Prairie Creek (Cadillac Explorations Ltd.); Pointed Mountain (Pan American Petroleum Corporation, Brinkerhauf Drilling Company, and R.J. Keen Contruction Ltd.). A total of six sets are located at Pointed Mountain and many of them are mobile units. The CNT equipment employs single-side-band operation. The sets at Fort Liard and Nahanni Butte may use two frequencies, i.e., 5856 and 5009 KHz, depending on whether

contact is to be made with Fort Nelson or Hay River. With the exception of the station at Trout River which works through Hay River, all are tied to the Fort Nelson Toll Centre. A sampling of rates is given in Appendix 1A.

#### The Canada Tungsten Mining Corp. Ltd.

This company currently operates a radio equipment for voice communications between its mine-site at Tungsten and its office at Watson Lake. Conversations with an officer of the company late in 1968 indicated that a V.H.F. radio installation was to be introduced for the company by CNT for improved communications between the mine-site and Watson Lake by the end of 1968.

### TELEPHONE & OTHER LAND-LINE FACILITIES

#### Canadian National Telecommunications

Fort Simpson is linked by cable to a repeater station on the CNT landline connecting Inuvik with Hay River. Eight long distance toll trunks and a 15 channel telegraph system are provided for Fort Simpson users. One of the voice channels is used for VHF communication with Jean Marie. Long distance telephone rates are shown in Appendix 1A.

The telegraph channels are used at the present time by Department of Transport in the operation of a teletype equipment for the passing of meteorological data; by a telex service installed in the Federal Building at Fort Simpson, and by private wire services.

An in-settlement subscriber telephone system is in operation in Fort Simpson. The installation includes a 150 line Rurax exchange, a cable distribution system for in-settlement connections and a separate cable to the Department of Transport airport. Long distance calls to the south are via micro-wave from Hay River /Enterprise.

#### Other

The settlement of Fort Liard possesses a limited in-settlement telephone system amounting to four connections. The hook-up is an all-party rural type using a hand-crank magneto for actuating the bells. The telephones were donated by the Alberta Telephone Co. a few years ago and a suspended cable hook-up was installed through local initiative. The system connects the premises of the Royal Canadian Mounted Police, Hudson's Bay Company, Federal Day School and the acting Administrator.

## MAIL & PARCEL POST

Mail enters the Lower Liard Region directly from Edmonton or via Fort Nelson. Pacific Western Airlines contracts with the Canada Post Office for the carriage of mail into Fort Simpson in accordance with its present twice weekly schedule. Mail for Fort Liard is routed via Fort Nelson, from where it is delivered under a charter contract with Northern Air Services of Fort Nelson.<sup>1</sup> No contract exists for the carriage of mail from Fort Nelson to Nahanni Butte because a post office does not exist in the settlement.<sup>2</sup> However, mail to and from the settlement is usually handled on a fairly regular basis by the local private trader who operates his own aircraft, or it may be handled by anyone else who happens to be operating an aircraft in the vicinity. Weights given for mail and parcel post in Table 4 are indicative of the amount of activity in this particular sphere of communications.

TABLE 4

### Movement of Mails & Parcel Post

(in pounds)

#### By Scheduled or Chartered Carrier

| Year    | <u>Fort Simpson</u> |          | <u>Fort Liard</u> |          |
|---------|---------------------|----------|-------------------|----------|
|         | Inbound             | Outbound | Inbound           | Outbound |
| 1967-68 | 50750               | 8453     | 5514              | 1071     |
| 1966-67 | 45061               | 7683     | 3746              | 920      |
| 1965-66 | 43490               | 7335     | 4264              | 999      |
| 1964-65 | 41993               | 6571     | 3362              | 843      |
| 1963-64 | 38129               | 5473     | 4254              | 782      |

Data Source: Air Services Division, Canada Post Office, Ottawa.

- 1 Under a charter contract the Canada Post Office contracts with the carrier for the delivery of mail at a specified frequency at regular charter rates. In the case of Fort Liard the frequency is at least once per month. The carrier may bulk passengers, or freight, with a mail flight but is obliged to apportion the cost of the charter accordingly.
- 2 Under the Regulations of the Canada Post Office a settlement must have thirty or more families and a Post Office revenue of at least \$1,000 p. a. before an official post office may be authorized.



## TRANSPORTATION

### AIR CARRIERS

Aircraft operation in the Lower Liard Region is more or less typical of operations generally in the N.W.T., once away from principal population centres. The sole non-directional beacon in the region is operated by the Department of Transport at Fort Simpson.

Landing strips of varying lengths and widths are located at each settlement and at each resource development site. The one at Fort Simpson is the only one under the control of Department of Transport. It is located some twelve miles south of the settlement, near the left bank of the Liard River. A second small strip is located on the island and is used by small aircraft. The strips at Simpson and the other settlements are dirt surface and, without exception, are unusable following rains. Those at Tungsten, Pointed Mountain and Prairie Creek have used a certain amount of rock ballast during construction and because of this, and by reason of elevation, superior drainage and soil type, are generally open during wet periods. Generally speaking, only the Department of Transport strip and strips at the resource development sites receive acceptable maintenance. All other strips may be considered poor at most times.

Float-equipped aircraft are the usual means of operation if landings are to be made in the field over the plains area to a great extent in the mountainous areas as well. Helicopter is the preferred means of transport by all who can afford it and is essential to surveys involving traversing.

The site-plans included as appendices provide some strip and landing information for aircraft operation in the region. Information relating to the strips not shown can be obtained from Department of Transport, or the companies concerned in the case of development locations.

### Pacific Western airlines

This company operates a scheduled air service into Fort Simpson on a twice weekly basis. Connections can be made at Yellowknife with the newly established lateral air route, and at Edmonton or Calgary with other carriers. The airline has an official agent at Fort Simpson. The inward and outward movement of passengers and freight between Fort Simpson and outlying points has increased steadily over the past five years. Table 5 provides a summary of payloads.

TABLE 5

| <u>Year</u><br><u>Month</u> | <u>Fort Simpson Inbound</u> |         |         | <u>Fort Simpson Outbound</u> |         |         |
|-----------------------------|-----------------------------|---------|---------|------------------------------|---------|---------|
|                             | Passengers                  | Express | Freight | Passengers                   | Express | Freight |
| Mar. 68                     | 67                          | 2786    | 5068    | 47                           | 470     | 981     |
| Feb. 68                     | 103                         | 3841    | 4456    | 95                           | 521     | 1636    |
| Jan. 68                     | 75                          | 3608    | 6559    | 81                           | 470     | 2196    |
| 1967                        | 978                         | 19613   | 132567  | 926                          | 3558    | 24241   |
| 1966                        | 905                         | 20101   | 118226  | 854                          | 3807    | 28978   |
| 1965                        | 752                         | 15043   | 125145  | 805                          | 3039    | 36688   |
| 1964                        | 736                         | 14817   | 97387   | 774                          | 2172    | 31110   |
| 1963                        | 685                         | 17467   | 109493  | 612                          | 1791    | 28456   |

Data Source: Pacific Western Airlines, Vancouver, B.C.

#### Canadian Pacific Airlines

Although this carrier does not operate a scheduled service in the Lower Liard Region, the frequency of its scheduled service into Fort Nelson, B.C. makes it a prime means of access to the larger part of the region. The company has a flight to Fort Nelson both from Vancouver and Edmonton, daily except Sunday. A private charter service is available at Fort Nelson for transportation to desired destinations. The advantages of routing via Fort Nelson are obvious and this means of entry and egress has been used extensively by companies active in the region.

#### Arctic Air Ltd.

This newly formed company recently took over the private charter service formerly operated by Northern Mountain Airlines Ltd. of Prince George, B.C. In the summer of 1968 the company was using one single-engine float-equipped machine and a twin-engine aircraft equipped with wheels. The company generally service those basing themselves at Fort Simpson or using the settlement as a jumping-off point.

#### Northern Air Services

Northern Air Services was mentioned previously in connection with mail. The company, based at Fort Nelson, operates a number of wheel and float-equipped aircraft as a charter service covering northern B.C. and the lower parts of Yukon and N.W.T. Passenger and freight rates applicable both to Arctic Air and Northern Air are given in Table 6 which follows:

TABLE 6Charter & Incidental Freight Rates

| <u>Location, Operator &amp; Equipment</u> | <u>Per Mile</u> | <u>Per Hour</u> |
|---|-----------------|-----------------|
| <u>Fort Simpson (Arctic Air)</u>          | \$              | \$              |
| Found - Floats                            | 0.55            | 55              |
| Apache - Wheels                           | 0.55            | 65              |
| <u>Fort Nelson (Northern Air)</u>         |                 |                 |
| Aztec - Wheels                            | 0.60            | 105             |
| Apache - Wheels                           | 0.55            | 77              |
| Piper - Wheels                            | 0.40            | 40              |
| Cessna - Wheels                           | 0.55            | 55              |
| - Floats                                  | 0.60            | 72              |

Incidental Freight Rates (these apply only to Northern Air Services, Fort Nelson)

For all aircraft types listed for this coy. \$0.0020 per /lb. /mile - minimum \$3.00

Data Source: Department of Transport, Ottawa

RIVER BARGE

Transportation by river is the oldest means of moving goods and people in the Lower Liard Region and has run the gambit from canoes and York boats through steam and diesel driven vessels.

Up to 1947, the largest common carrier on the Mackenzie and Liard River was Mackenzie River Transport, a division of the Hudson's Bay Company. This was an out-growth of its freighting activity which began with the turn of the 18th century.

Northern Transportation Company began operations in 1935 as a subsidiary of Eldorado Gold Mines for the purpose of supplying the company's mining properties on Great Bear Lake. In 1944 the Federal Government expropriated Eldorado Mining and Refining Limited, and in the process acquired title to Northern Transportation Company. Thus ended all effective competition in river transportation on the Mackenzie. A small company based at Fort Simpson operates a barging service as far as Fort Providence and is discussed later in this chapter. It does not seem that N.T.C. has seriously considered extending its operations to the Liard River. The Liard is less predictable than the Mackenzie and rather formidable competition already plies its more interesting parts which are situated between Fort Nelson and Nahanni Butte.



A number of barging companies based at Fort Nelson operate into the Lower Liard Region via the Nelson and Liard Rivers. In view of the geographic position of the presently known resources in the region this is the most logical and efficient routing of supplies. Together, these companies account for tonnages far in excess of those moved into the Lower Liard Region via N.T.C. from Hay River. The present level of activity on this route is unlikely to diminish at least for the next five years or perhaps longer.

### Northern Transportation Company

N.T.C. is undoubtedly the best equipped for river transportation of any company and has experienced a steady growth in activity and sophistication of barging equipment. In the coming year it expects to add barges and tugs at a cost in excess of \$2,000,000 to move the huge supply requirements of oil exploration in the Arctic Coast region.<sup>1</sup> (Appendix 2)

The company moves general cargo, blended and special fuels from Hay River over the Mackenzie system; servicing settlements and resource development sites along the way. Lower grade gasoline, diesel and heating fuels are moved north and south out of the refinery at Norman Wells. At least along that part of the route above Norman Wells, the movement of fuels can be considered as back-haul.

The length of the barging season on the Mackenzie River, and by implication Great Slave Lake, is generally from early June until mid-October. Ice clears earlier at Fort Providence and earlier still at Fort Simpson. N.T.C. has taken limited advantage of this by leaving some equipment at Fort Providence over the winter to move trucked supplies down river ahead of break-up on Great Slave Lake. Once the all-weather road from Fort Providence to Fort Simpson is completed, the laying-up of barges and tugs at Fort Simpson should be an interesting possibility for the earlier supply of companies engaged in development below Fort Simpson.

The types and displacements of N.T.C. river equipment are summarized in Appendix 2. Table 7 gives N.T.C. freight movements into Fort Simpson in recent years, and Table 8 shows the current tariff structure.

---

1 N.T.C. (1947: p. 3) notes that in 1949 the river equipment of this Crown Corp. was valued at \$4,000,000; most of this amount being measurable as an increase over a mere \$140,000 valuation in 1935. The peak freight year over this 14 year period was in 1948 when nearly 50,000 tons of mixed cargo were handled. By 1967, according to the N.T.C. annual report, the value of river equipment had risen to over \$14,000,000. Freight moved during the same year amounted to 166,214 tons. (1967)

TABLE 7

N. T. C. Freight Movement Into Fort Simpson  
(in short tons)

| Year | X-Hay River |            | X-Norman Wells |            | X-Waterways |  |
|------|-------------|------------|----------------|------------|-------------|--|
|      | Fuel        | Gen. Cargo | Fuel           | Gen. Cargo | Total       |  |
| 1964 | 255         | 330        | 3193           | 65         | 3843        |  |
| 1965 | 1810        | 206        | 938            | 48         | 3002        |  |
| 1966 | 1290        | 192        | 3477           | 22         | 4981        |  |
| 1967 | 400         | 575        | 3209           | 29         | 4213        |  |

Data Source: Northern Transportation Co., Edmonton

TABLE 8

Current N. T. C. Tariff Structure  
(To Fort Simpson)  
in \$

| Class                  | X-Hay River | X-Norman Wells | X-Waterways |
|------------------------|-------------|----------------|-------------|
| Gen. Cargo (pkg. gds.) | 1.00 cwt    |                | 2.53 cwt    |
| Chilled Cargo          | 1.50 cwt    |                |             |
| Refrig. Cargo          | 3.00 cwt    |                |             |
| Drum Fuel              |             | 1.25 drum      |             |
| Bulk Fuel              | 0.42 cwt    | 0.62 cwt       |             |

Data Source: Northern Transportation Co., Edmonton

Lindberg Transport Ltd.

This company is licensed by Department of Transport to operate a river barging service between Forts Simpson and Providence. Its base is Fort Simpson and the background of the company is discussed in greater detail in the chapter on the population centres.

River equipment consists of a diesel-powered tug and a steel barge. The displacement of the barge is approximately 70 tons. The company aims at one round trip per week. Freight is generally mixed cargo, excluding fuels.

Refrigeration for perishables is achieved by the use of solid CO<sub>2</sub> (dry ice). Cargo is trucked either from Hay River, or directly from Edmonton to Fort Providence for pick-up by Lindberg Transport.

The operation is comparatively small and was started as recently as 1959 to take advantage of a building program at Fort Simpson. Since that time the company has maintained a reasonably steady movement of freight and has improved its equipment. Traffic and rates are summarized in table 9 below.

TABLE 9

Freight Movements Lindberg Transport Ltd.

(inbound/outbound Ft. Simpson)

| Year | Tons |   |
|------|------|---|
| 1964 | 408  | (includes 12 vehicles and 21, 000 FBM lumber) |
| 1965 | 461  | (includes 38 vehicles and 68, 000 FBM lumber) |
| 1966 | 430  | (includes 20 vehicles)                        |
| 1967 | 160  | (partial year only)                           |

Lindberg Transport Ltd. Tariff Structure

(X - Fort Simpson or Fort Providence)

| Cargo                     | Dollars   |
|---------------------------|-----------|
| General Cargo             | 1. 50 cwt |
| Frozen Food               | 2. 00 cwt |
| Perishable Food, Unfrozen | 2. 60 cwt |

Data Source: Lindberg Transport Ltd. , Fort Simpson

The preceding paragraphs explain very briefly the status of river transportation along the northern fringe of the Lower Liard Region. It would be well to mention that very little if any of the freight involved in this activity on the Mackenzie River finds its way into the region proper which is located south and east of the river. The principal river transportation for the region originates at Fort Nelson, B.C. Unfortunately, detailed information on the companies and the level of freighting activity could not be obtained so, of necessity, this will be reflected in the discussion that follows.

The companies maintain a marshalling area on the Nelson River opposite Old Fort Nelson, B.C. (Plate 7). Its size is approximately twenty acres and a variety of heavy equipment is kept there for the maintenance of the area and for the loading and unloading of cargo.





Plate 7 - View of the marshalling area for river barge cargo on the Nelson River opposite Old Fort Nelson, B. C.

#### Kaps Transport Ltd.

Of the three companies barging out of Fort Nelson Kaps is the most recently established in this kind of transportation. It is, however, the company with the greatest financial resources and figures large in the sphere of vehicular transportation associated with petroleum exploration.

Kaps entered river transportation at Fort Nelson late in the 1967 shipping season and moved only 150 tons of cargo before the season ended. In 1968 however, the company was fully occupied. Two sectional barges and one tug were in use during the summer of 1968, but more were expected to be added as demand increased.

The barges measure 24' x 80' and 20' x 70' with a hull depth of 5' and 4'. Displacements would be, respectively, 150 tons at  $2\frac{1}{2}'$  draught and 80 tons at 2' draught. The latter barge is shown in plate 8.



Plate 8 - View of sectional barge of roughly 80 tons displacement being secured to river-bank for loading. The barge is divided into four sections and is readily transportable.

#### Cooper Barging Services Ltd.

This company entered the river barging service about twelve years ago and has operated consistently ever since. It handles small Government cargos for the settlements of Fort Liard and Nahanni Butte which, in 1968, were estimated to be in the order of 1,000 tons and consisted of general cargo and fuels. Its two barges are non-sectional and are of approximately 80 tons displacement.

#### Streeper Transport Ltd.

Streeper Bros. have been established in river transportation for over twelve years but have operated intermittently over that period. During the summer of 1968 it was operating two tugs and two barges in the Lower Liard Region (Plate 9).

This company's equipment fits the general pattern of equipment discussed above which, in turn, fits the pattern established for the rivers of the Mackenzie District. The design is dictated by the generally shallow fast-flowing rivers and the economics of payload under these conditions. All tugs are designed with tunnels to channel water to the propellers to avoid fouling. N. T. C. equipment is almost of identical design but is considerably larger to take advantage of the larger river systems over which it operates.



Precise tonnages moved by the three companies could not be obtained but an officer of one company estimated a total of roughly 15,000 tons for the 1968 season. One thousand tons were destined for the settlements as supplies and the balance of 14,000 tons consisted of fuels, exploration equipment and general supplies required for natural gas exploration in the Lower Liard Region.



Plate 9 - Barging exploration equipment and crews up-river past Fort Liard. The river is in summer flood. Two tugs and barges are lashed side by side for greater effective power and safety.

### ROADS

In the Territorial setting, roads may be divided first into two major categories, i. e., "all-weather" and "winter". To deal with the latter first; winter roads are simply routes that rely upon a frozen-ground condition to serve as a road-bed for the passage of vehicles. The necessity to avoid, or travel around, the smallest of obstructions results in a sinuous course for most winter-roads. They have proved invaluable as supply routes to isolated settlements and are in use today in the region. The costs of construction and maintenance are minimal and can be argued only in terms of possibly reduced vehicle life.

All-weather roads, for the purpose of discussing the Lower Liard Region, may be divided into: Secondary Trunk Highway, paid for by the Federal Government, and in the case of the Lower Liard Region constituting an extension of the Mackenzie Highway System; Area Development Road, paid for by the Federal Government, and Permanent Access Road paid for 2/3 by the Federal Government and 1/3 by the interested resource developer. The current status of roads in the south of the Mackenzie District is depicted in map 5.



Other types of routes are also covered by the Northern Roads program of the Federal Government, e.g., tote trails,<sup>1</sup> initial access roads, etc., but no instances of such routes are known to the author in the Lower Liard Region.

## WINTER ROADS

### Providence/Simpson Winter Road

At the present time this route serves as the winter access to supply trucks out of Hay River and/or Edmonton. The route leaves the Mackenzie Highway extension at mile 117 and crosses the Mackenzie River below Mills Lake. From there it courses along the north side of the river to Fort Simpson, crossing the Mackenzie again opposite the settlement. The length of the route from mile 117 to Fort Simpson is approximately 160 miles and the driving time is in the order of 10 to 14 hours.

The most frequent users of the route are the Hay River, Grimshaw and Monarch trucking companies. Rates from Edmonton range roughly from \$5.00 to \$2.80 per cwt., depending upon tonnage and volume. From Hay River to Fort Simpson the rates are in the order of \$3.25 to \$2.75 per cwt.<sup>2</sup>

### Fort Nelson/Fort Simpson Winter Road

This road is well-travelled between Fort Nelson and Pointed Mountain but is no longer used as a supply route to Fort Simpson. It is still the only means of access to the several gas fields located in the Liard structural basin, in the plains area east of the Liard River.

The principal user of the road is Kaps Transport Ltd. which operates heavy trucking equipment in the transportation of drilling and camp supplies to well-sites. According to an officer of the company, tonnages moved during the past few years have averaged about 25,000 tons annually.

- 
- 1 Tote Trails must now be approved by the Government of N. W. T. which may undertake to provide financial assistance up to a maximum of 50% of the construction costs.
  - 2 Hay River Trucking of Hay River, N. W. T. estimated its tonnage to and from Fort Simpson at 1,000 tons during the 1967/68 winter, and 42 tons to the Fort Providence barge landing up to August of the 1968 summer operating period. The other companies mentioned in the text of the report did not respond to requests for a summary of tonnages moved.

## ALL-WEATHER ROADS

### Fort Providence - Fort Simpson Mackenzie Highway Extension

Construction of this road began at mile 117 south of Fort Providence as an extension of the existing road from Hay River. By October 1967 the road was graded as far as mile 167. A second contract for construction was raised in February 1968 and the road will have been graded to Trout River, about mile 204, by the end of the same year. The right-of-way is expected to be cleared to its termination-point opposite the Department of Transport air-strip near Fort Simpson early in 1969. A contract for completion of the grading is to be let also in 1969.

A ferry service is planned for the Liard River to connect the airport road on the left bank of the river with the Mackenzie Highway termination on the right bank. The Trout River will be spanned by a concrete/steel bridge roughly 400' in length. Lesser streams are dealt with by grading over diversion culverts (Plate 10).

The road is 32' wide, excluding shoulders, is well ballasted and gravel-surfaced and should greatly improve the supplying of Fort Simpson and its immediate vicinity. As well, if preparations are made, it could extend the opening of the barging season below Fort Simpson by at least two weeks or perhaps longer. Construction costs for this road have so far ranged from approximately \$35,000 to \$50,000 per mile.



Plate 10 - Grading over diversion culverts for the Bouvier River at mile 175 in August, 1968. The culvert openings face south and the Mackenzie River lies about seven miles to the north.

## Nahanni Range Area Development Road

This road was completed about 1963/64 to open-up a potential resource area in the Yukon. It has a length of approximately 80 miles commencing near Watson Lake and terminating approximately 50 miles short of Tungsten, N.W.T.<sup>1</sup> The route is tied to the Alaska Highway. Footnote<sup>1</sup> discusses construction and other costs relative to the Nahanni Range Road and also the permanent access road to the mine-site.

## Cantung Permanent Access Road

The Cantung road is essentially an extension of the Nahanni Range Road discussed above but is separated because of the basis of financing for its construction. The length of the road from the termination of the Nahanni Range Road is roughly 40 miles, and probably an additional 10 miles are taken up in roads at or near the mine.

This road system to Watson Lake receives almost daily use in the hauling of mill concentrates to the transfer point at Watson Lake, and also in hauling supplies to the mine and the townsite.

## Airport Road

The only airport road of consequence is the one connecting Fort Simpson with the Department of Transport air-strip. It has a length of approximately 12 miles and is only spottily gravelled. It will probably become the extension of the Mackenzie Highway into Fort Simpson or may, on the other hand, be classed as a settlement access road.

## Other Roads

Settlement Roads - these are properly classed as municipal roads. Small networks are present in Forts Simpson and Liard. These are shown on the site plans appendices 3 & 7 along with their estimated total length.

Privately Financed Service Roads - The natural gas fields at and around Pointed Mountain are serviced by an estimated 30 - 50 miles of well maintained roads. Road construction was financed by the Pan American Petroleum Corporation. The road network connects with the Fort Nelson Winter-Road described earlier. It is estimated that road and bridge construction has so far cost this company nearly \$1,000,000.

---

1 The cost of construction amounted to just over \$2,000,000 or roughly \$25,000 per mile. The Federal Government bore the entire cost of this, the Nahanni Range Road. Construction of the Cantung Road was the responsibility of the Canada Tungsten Mining Corp. and cost approximately \$1,100,000 or about \$22,000 per mile. The Federal Government financial contribution, in accordance with the Northern Roads Program, was about \$667,000. The mining company places its annual road maintenance cost for the Cantung section at \$1200 per mile, including snow clearing.



About 15 - 20 miles of rudimentary service roads have been built by Cadillac Explorations Ltd. in the development of its mineral property at Prairie Creek.<sup>1</sup> These are used by caterpillar tractors and trucks engaged in stripping the several veins exposed on the property. The roads have been constructed under the most difficult conditions of any in the Lower Liard Region and are indicative of what can be accomplished in areas hitherto classed as inaccessible.

### IMPROVEMENT & EXPANSION OF COMMUNICATION SYSTEMS

Generally Speaking, communication systems are continually undergoing a small amount of improvement and expansion. It is the intention of the report, therefore, to make mention of plans, or intentions, to introduce major changes of one kind or another affecting the present status of the systems discussed in this chapter.

#### WAVE PROPAGATION SYSTEMS

Canadian National Telecommunications have indicated, through a personal communication, the intention of that company to establish a micro-wave link between Forts Simpson and Nelson by, or during 1970. The link will provide 36 channels with repeaters.

In conjunction with the micro-wave project, one or more VHF base stations may be established within range of the link to provide a radio-telephone service to resource developers operating east of the Liard River, and in the newly opened area around Horn Plateau. Nahanni Butte and Fort Liard should benefit greatly as a result of these events. Fig. 1 shows the approximate locations for the expansion of wave systems.

#### RIVER BARGING

Reference is made to planned expansion of river equipment by N. T. C. under "TRANSPORTATION" in this chapter and also in Appendix 2.

#### ROADS

##### Secondary Trunk Roads

Under its Northern Roads Program the Federal Government plans to extend the Mackenzie Highway extension to Fort Simpson, presently under construction,

---

1 The roads were constructed in a period of about six weeks at a cost of roughly \$1200 per mile.

south to the Territorial/B. C. border.<sup>2</sup> Construction may begin in 1971/72 progressing south from Fort Simpson. Route surveys were being carried-out in 1968 and these are expected to continue, perhaps for the coming two years.

A through north-south route is very critical to the immediate and future development of the Lower Liard Region and certain comments regarding it are contained in the conclusions reached in this report.

### SUMMARY

The Lower Liard Region, as in its physical aspects, affords an interesting contrast in the development of its communication systems. For example, by 1970 the region is likely to be traversed by a micro-wave link offering the most up-to-date conventional facilities for voice and data transmission in use anywhere in the world, while access by major surface carriers is possible for only a few months of the year and the less affluent native must resort to canoe or dog-team for travel

Fort Simpson is serviced by a scheduled air service twice weekly while Fort Nelson, B. C. is serviced by six daily flights each week. From either location it is necessary to arrange through private charter for flights into the interior of the region.

The present arrangement of official contracts for the carriage of mail into Fort Liard and Fort Simpson would, in the circumstances, seem adequate for the present. The existing unofficial method of mail carriage to Nahanni Butte appears inadequate from a number of standpoints.

One of the largest barging systems on the continent operates on the Mackenzie River along the northern fringe of the region. Only a minor part of the total tonnage moved is dropped at Fort Simpson. A smaller but higher frequency barging system operates out of Fort Nelson into the Lower Liard Region and accounts for the movement of relatively large tonnages.

Voice communications are possible over several radio networks established in the region. Telex and a long-distance telephone service are available at Fort Simpson and will soon be available at other locations in the region.

---

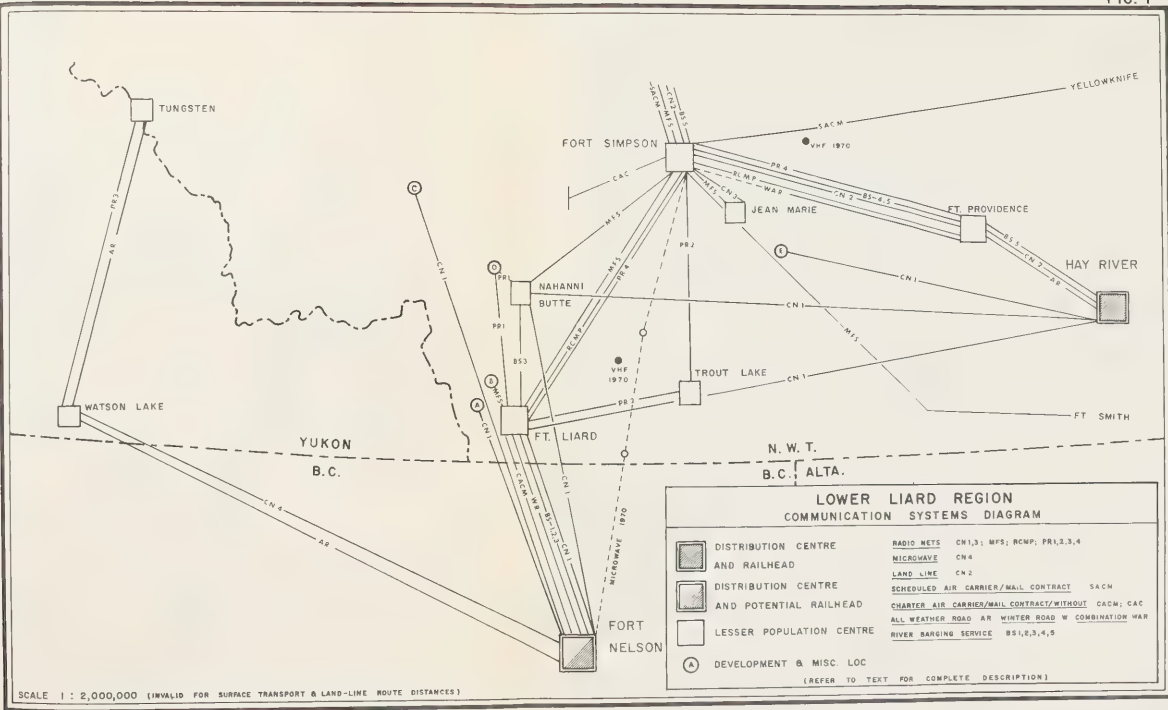
2 The real worth of this road is contingent on the Government of British Columbia constructing a similar road from Fort Nelson to meet the termination of the Mackenzie Highway extension at the common border. The crossing point on the border has been designated, but the author is unaware of any commitment by the B. C. Government to build the Fort Nelson section of the road.

Vehicular traffic is presently confined to winter-roads which eventually will be supplanted by all-weather roads currently under construction, or planned for construction in the foreseeable future. These roads, when completed, will have a profound effect on river barging insofar as it concerns the Lower Liard Region. Finally, due to geography, economic alignments and likely some political motivation, there is much evidence of east-west and at the same time a north-south pull on communication systems generally. In more precise terms, lateral routes appear to be competing financially with the perhaps more essential north-south routes.



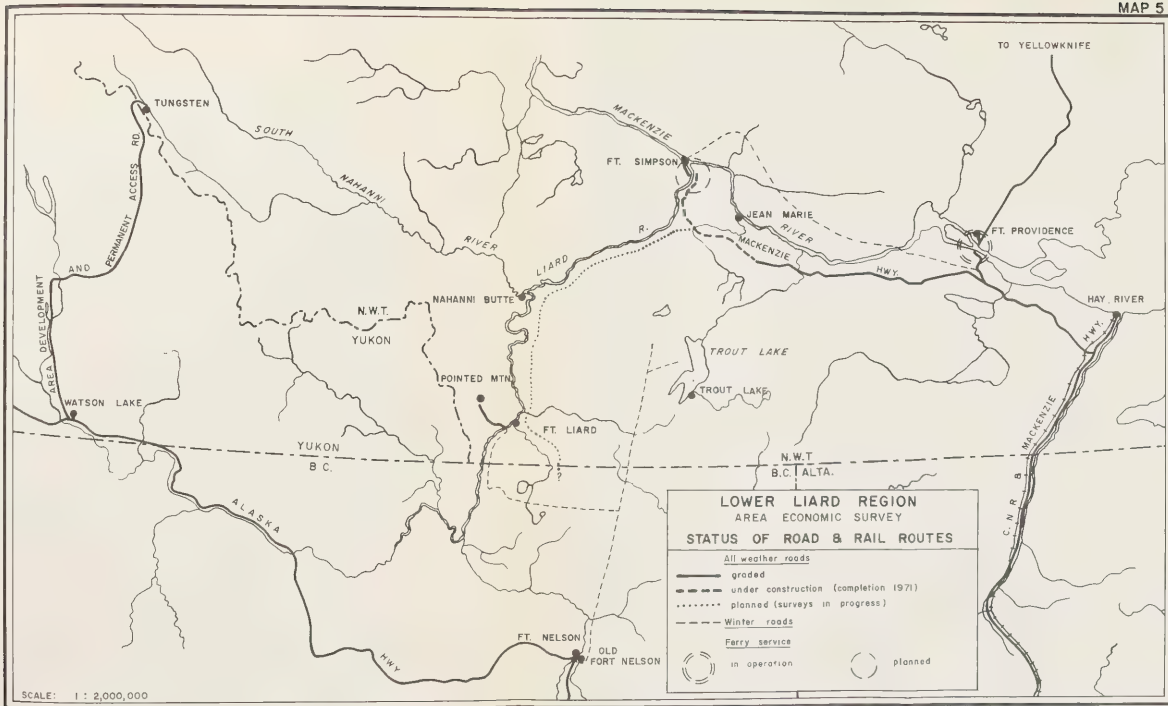


FIG. 1











## CHAPTER 3

### POPULATIONS

#### INTRODUCTION

The purpose of this chapter is to introduce the populations of the Lower Liard Region. The plural is used because the requirements of the report cannot be adequately served by assuming that only one population is present in the region. There are in fact several populations.

Besides the obvious ethnic differences which tend to distinguish the populations, they are further distinguished through differences brought about by the term and purpose of residence of certain groups, as opposed to others inhabiting the same or separated locations within the region.

The report does not pretend to comprehend fully the subtle socio-economic interplay which exists between the several possible groupings in the general population sphere, but will be satisfied if it is able to impart only a general appreciation of their characteristics and relationship. Economic differences between them are far easier to comprehend and will be brought forward in a subsequent chapter.

A diagram, fig. 2, is included to help the reader visualize the manner in which the report treats the populations. Moreover, to deal with the populations alone in the diagram would deprive the reader of the opportunity of relating them immediately to their respective population centres; the nature of which, in a few instances, determines the type of population. The diagram must also serve chapter 4 which discusses briefly the population centres themselves.

The largest, permanently-based population element in the region is of course the Native Indian. In recent years the Indian has become more or less entrenched in the settlement type of existence, and only at Fort Liard does he still adhere to his traditional semi-nomadic way of life on a significant scale (map 6). By and large, most Indians residing in the region may be assigned to a low labour mobility factor in that their movements are generally confined to the vicinity. Few would consider moving permanently out of the region for any reason.

The second permanent element in order of size is the Metis group. The largest population resides at Fort Simpson and is firmly rooted in the community. As a whole, the group should be considered as one possessing low labour mobility.

The third and last permanent element in order of size is the White settler group. Again, the largest concentration is at Fort Simpson. In some families two generations have been born and raised in the community. Relatively speaking, the group should be assigned a low labour mobility rating. Mobility in this group, however, is clearly a matter of degree and circumstances. Compared with the Indian and Metis elements, for example, the permanent Whites have a potentially



FIG. 2

### PERMANENT POPULATION CENTRE

#### POPULATION WITH LOW TO MODERATE MOBILITY

|                                  |                   |                  |                   |                    |                     |
|----------------------------------|-------------------|------------------|-------------------|--------------------|---------------------|
| ESTABLISHED                      | 1800<br>FT. LIARD | 1940<br>N. BUTTE | 1900<br>TROUT LK. | 1915<br>JEAN MARIE | 1804<br>FT. SIMPSON |
| TOTAL POPULATION                 | 238               | 69               | 44                | 51                 | 830                 |
| <u>COMPOSITION</u>               |                   |                  |                   |                    |                     |
| <u>PERM. POP.-(LOW MOBILITY)</u> |                   |                  |                   |                    |                     |
| NATIVE                           | 219               | 62               | 44                | 50                 | 469                 |
| METIS                            | 11                | 1                | -                 | -                  | 96                  |
| WHITE                            | -                 | 4                | -                 | -                  | 45                  |
| <u>FLOATING POP.</u>             |                   |                  |                   |                    |                     |
| METIS                            | -                 | -                | -                 | -                  | 1                   |
| WHITE                            | 8                 | 1                | -                 | 1                  | 220                 |

### SEMI-PERMANENT POPULATION CENTRE

#### POPULATIONS WITH MODERATE TO HIGH MOBILITY

|   |                     |                  |                     |
|---|---------------------|------------------|---------------------|
| ESTABLISHED   | 1966<br>POINTED MT. | 1962<br>TUNGSTEN | 1966<br>PRAIRIE CR. |
| TOTAL POPULATION  | 20 - 35             | 123 - 169        | 10 - 17             |
| <u>COMPOSITION</u>  |                     |                  |                     |
| NATIVE  | -                   | 1 - 1            | -                   |
| WHITE   | 20 - 35             | 122 - 168        | 10 - 17             |
| Varying population due to seasonal cut-back in certain operations |                     |                  |                     |

### TEMPORARY POPULATION CENTRE

#### POPULATIONS WITH HIGH MOBILITY

|                    |                         |                        |
|--------------------|-------------------------|------------------------|
| ESTABLISHED        | 1968<br>CAMSELL<br>BEND | 1968<br>TROUT<br>RIVER |
| TOTAL POPULATION   | 40 - 50                 | 35 - 60                |
| <u>COMPOSITION</u> |                         |                        |
| NATIVE             | 10 - 17                 | 1 - 14                 |
| METIS              | -                       | 5 - 7                  |
| WHITE              | 30 - 33                 | 14 - 54                |

Varying population due to lag  
in labour turn-over and  
Seasonal cut-back in certain  
operations.

NOTE: MOBILITY = LABOUR MOBILITY

high labour mobility because they could flow readily into community life anywhere in the country. Most, however, are firmly rooted due to family and local business interests.

Superimposed on the permanent population, especially at Fort Simpson, is a largely White floating population to which, as a group, is assigned a rating of moderate labour mobility. This rating, again, is relative to the high labour mobility group discussed in succeeding paragraphs. The floating population consists largely of Government staff in numerous categories, the clergy, and the staffs of the hospital and certain commercial establishments. The term of residence can range from one to perhaps ten years. Fort Liard has the next largest population of this kind. It is of interest to note in passing that no Indians, and only one Metis, were included in this particular category of population at Fort Simpson.

The balance of the population in the region are identified with specific kinds of population centres, i.e., semi-permanent and temporary centres. The former of these centres are, in fact, flourishing because of the development of specific non-renewable resources, and the latter centres result from test and improvement projects. Both are distinguishable from the permanent centres discussed above, and so also are their respective populations.

The individuals populating these centres possess very high labour mobility and are not on the whole apt to become rooted; even should some of the sites develop into communities of many years duration. The populations associated with them are usually subject to wide fluctuations in numbers due to labour turn-over and seasonal cut-backs in certain operations.

Paradoxical as it may seem, the Indian is an anomaly in his traditional country. Not only is he nearly out-numbered by white populations in the region but, more importantly, the pace of his socio-economic development lags far behind the pace at which other developments are proceeding in the region. Each new development tends to accentuate this socio-economic dilemma of the Slave Indian who is rated among the most primitive of Indians in Canada.

Because the Indian constitutes the largest element of the permanent populations in the region at the present time, the balance of this section is devoted to discussing some general circumstance affecting them in the region. Following this, the structural and other population data will be treated, as fully as possible, on a settlement by settlement basis.

## NATIVE INDIAN POPULATION

### Political Organization

All Native Indians in the Lower Liard Region belong to the Slave Tribe which, in turn, is allied to the Athapaskan Linguistic Group. With the exception of

possibly one or two enfranchised Indians residing in Fort Simpson, all other are Treaty Indians and as such are subject to the Indian Act and also figure in the provisions of Treaty II, concluded in 1921, between the tribes of the Mackenzie District and the Government of Canada.<sup>1</sup>

The smallest recognizable political unit of Indian organization is the Band. Two such Bands are established in the Lower Liard Region: the Fort Simpson Band and the Fort Liard Band. These are designated officially as, respectively, Band 09 and Band 10. The Government accounts for the Indian population by Band membership; for the most part regardless of place of residence. The name-identity of a Band will generally indicate the principal place of residence but ignores the fact that residence involves several settlements, often over one hundred miles apart.

Under the provisions of the Indian Act, each Band elects a Chief and two or three Councillors from among themselves who undertake to manage Band affairs in cooperation with the Regional Superintendents of the D. I. A. N. D.

Higher in the Indian political structure is the Regional Indian Advisory Council whose membership is made up of certain Band Chiefs elected to sit on the council. This multi-Band political unit brings Indian problems before the Territorial Government Authority.<sup>2</sup>

The final and highest political unit is perhaps the National Indian Advisory Council which is designed to be more or less representative of the nationwide Indian population.

### Social Organization

The basic social unit of the Indian population throughout the region is the household. This quite naturally extends to groups of families or households, related by family ties or unrelated, living together in a common location.

The composition of the population of settlements, and in some cases their isolation, may produce profound affects on the simplicity or complexity of the Indian social organization. To some extent, also, the affluence of individuals and families in the Indian group is apt to influence their social standing within the group; but, this does not necessarily imply social acceptance outside the Indian community.

- 
- 1 Although the Treaty makes provision for the Indians to take up land to be set aside as reserves in the N. W. T., none have so far chosen to do so. There are, therefore, no established Indian reserves in the N. W. T.
  - 2 The Indian Advisory Councils are rather quasi-political by nature. They are not a natural socio-political organization of the Indian but were instigated by the Government as vehicles of advisement on matters affecting the Indian. The recently formed National Indian Brotherhood, along with its Provincial and Regional affiliates, may well emerge as an important political vehicle for the Indian people but it is too early to speculate as to its future shape or influence.



Ronald Cohen (1962: p.25) makes reference to the complexity of social organization in Fort Simpson, and, in saying this, takes into consideration all ethnic groups and classes of populations. It is evident from his report that there are far fewer social differences in the Indian social organization than among White elements.

Informal social contact between the differing ethnic groups is achieved mainly through recreational sports among the younger people and dances held at the community centre. Virtually all formal contact between Indians and Whites has to do with economic processes of one kind or another which are continually in progress. In most other respects ethnic lines appear to be clearly drawn. This seems true also for the Metis, in spite of their pronounced affinity with the local Indian.

Common ground is found in the two dominant religions in the community which include representatives of all ethnic groups among their respective followings. Although differences have arisen between the two religious bodies in the past over education, it is clear that their objectives over the past one hundred years have been remarkably the same regarding the social improvement of the Native Indian. The degree of success achieved by these religious institutions over that very long period serves to emphasize the difficulties in achieving social equality for the Indian and improving his level of acculturation.

Outside of Fort Simpson in the lesser permanent settlements, the populations, being almost entirely Indian, are homogeneous. There is perhaps a far greater reliance or interdependence of one family upon the other and, on the whole, social organization is simpler, though not necessarily trouble-free.

Responsibility for the upbringing and direction of children within the family usually devolves upon the father in the case of male children, and upon the mother in the case of females. This applies in the settlement or the bush.

Local group social activity usually takes the form of drinking parties and native dances, in and out of doors. The community clubs which have sprung up in the smaller settlements, as well as at Fort Simpson, provide facilities for all kinds of social gatherings, including movies. However, only at Fort Simpson is drinking occasionally licenced on club premises.

Formal contact between the very few Whites and the Indians of the smaller settlements is no different than that encountered at Fort Simpson. The division is clear in the formal social sphere, but disappears in joint endeavours connected with the community club, and such events as movies or sports.

### Acculturation

As Cohen (1962: p.28) has remarked, "There is a large number of English speakers among the Indians at Fort Simpson in all age groupings." It would be fair to add, however, that usage of intelligible English is not quite so widespread as to include large numbers in all age groupings. It is spoken best among those in the younger age groups.

English usage among the Indians, and also its quality, deteriorates rapidly once outside Fort Simpson. Only comparatively small numbers of older people are able to speak it at all and, here again, the best group is the very young; especially those who have received some education in the higher grades at Fort Simpson.

At Trout Lake only two or three persons are able to handle the language adequately enough for intelligent conversation. The absence of a day school at this settlement places the younger children at a distinct disadvantage with regard to language ability and education generally.

Most Indian parents in these times would experience difficulty in persuading the young to take up the traditional pursuits of hunting and trapping when the lesson of wage employment is so plain. The Indian has become most adept at undertaking work tasks requiring mechanical ability and judgement and has had some opportunity, however limited, to participate in work where these skills can be exercised. There is evidence, however, of a deficiency in that aspect of acculturation that has to do with the attitude toward wage work and employers.

Generally speaking, the Indian has yet to discover the full implications of reliability and responsibility when adapting to wage labour pursuits. Considerable allowances are made by employers, Government included, to bridge the attitude gap in this respect but it will remain, for a long time, far easier to train the Indian in manual skills than it will be to instill a change of attitude.

### Movements

The Indians of the region are motivated to movement for several reasons, but comparatively few concern themselves with movement outside the region to take up employment. This ethnic group was previously assigned a low labour mobility rating so we are concerned, therefore, with movement that takes place in the region, and which may be of a temporary or permanent nature. Most movements are initiated for one or more of the following reasons: livelihood - seasonal movements associated with trapping, hunting or short-term wage labour; education - movement of children to and from Fort Simpson for schooling, and medical - the movement of individuals to and from Fort Simpson for treatment.<sup>1</sup> Of lesser frequency are movements associated with inward and outward permanent migration between settlements of the region.

---

1 It should be clear that in the cases of schooling and medical requirements it may be necessary to travel temporarily outside of the region, to Yellowknife or Edmonton for example, but these movements are deemed to fall within the context of regional movements and cannot be confused with mobility in the context of labour.

It was mentioned earlier that, by and large, the Native populations are settlement-based and only the Indians of Fort Liard are given to local movements on a large scale; these for the purpose of livelihood. More details concerning this characteristic will be given under that particular settlement, but movements generally will receive further mention only where it may be desirable to emphasize a particular point.

### Regional Population Levels

The diagram, fig. 2, provides a fairly accurate accounting of the magnitude of present population levels, and, in the final analysis, those levels are the only ones of real importance. However, Jenness (1955: p.392), quoting Mooney, places the entire pre-European Slave population at 1,250 persons and goes on to say that in 1955 there were no more than 800.

At the present time, they number nearly 850 in the Lower Liard Region alone and it would be safe to assume that the Slave people are recovering from a post-European decline. Their numbers are again approaching pre-European levels, as indicated by Jenness, and are bound to exceed them in the not distant future.

### General

Before commencing the survey it was first necessary to perform a census to place the Native population in centres of residence because, as already noted, it was not an express function of the Band lists to place individual membership in places of residence. The difficulties of treating populations were further compounded by the fact that several agencies were responsible for the recording of vital statistics. For those reasons, it was virtually impossible to isolate vital statistics pertinent to Nahanni Butte and Jean Marie from Band statistical information gathered at Fort Simpson. The Catholic Mission at Fort Liard, however, records statistics by settlement so the data presented for Fort Liard, Trout Lake and Nahanni Butte are accurate, by settlements.

Needless to say, populations are constantly undergoing changes of many kinds and the data presented are usually valid only at the time of their compilation in the field, i.e. July/August 1968.

### FORT LIARD

Broadly speaking, the population of Fort Liard is homogeneous. Two families of mixed-blood reside permanently in the settlement but are virtually entirely merged with the Indian element. A small floating population of Government personnel; the H.B. Co. mgr. and a Catholic priest make up the balance.



### Whites (Floating Element)

In the summer of 1968 the total number of Whites residing in the settlement amounted to 8 persons:

|  | <u>Males</u> | <u>Females</u> | <u>Children</u> | <u>Total</u> |
|--|--------------|----------------|-----------------|--------------|
| A /Administrator /Power Plant Operator | 1            | 1              | 3               | 5            |
| R.C.M.P.                               | 1            |                |                 | 1            |
| H.B. Co.                               | 1            |                |                 | 1            |
| Catholic Mission                       | <u>1</u>     | —              | —               | <u>1</u>     |
| <u>Total</u>                           | 4            | 1              | 3               | 8            |

A single R.C.M.P. constable was placed in the settlement in charge of the detachment pending the arrival of a permanent officer and his family. As well, a school teacher and his family were expected in the settlement toward the end of August. These changes will likely have boosted the floating population to roughly 14 persons by the end of 1968.

### Metis

The Metis component of the population was permanent and totalled 11 persons spread over two households. The structuring was as follows:

#### Metis Age Groups and Sex

| 0 - 5 |   | 6 - 10 |   | 11 - 15 |   | 16 - 20 |   | 31 - 35 |   | 36 - 40 |   | 56 - 60 |   |
|-------|---|--------|---|---------|---|---------|---|---------|---|---------|---|---------|---|
| M     | F | M      | F | M       | F | M       | F | M       | F | M       | F | M       | F |
| -     | 2 | -      | 1 | 1       | 1 | 1       | 2 | 1       | - | -       | 1 | 1       | - |

### Indian

Fig. 3 shows the structure of the Indian population in July of 1968. The picture conveyed by the pyramid is one of apparent viability. A few of the interesting data revealed in the pyramid are summarized below:

|  |                |
|--|----------------|
| Ratio - males to females               | <u>1.43: 1</u> |
| Percentage of population under 35 yrs. | <u>75</u>      |
| " " " between 35 & 65 yrs.             | <u>21</u>      |
| " " " over 65 yrs.                     | <u>4</u>       |

It is of interest to note, also, that about 34.4 per cent of the female population is presently of child-bearing age, and, while this group will be augmented by 46 additional females over the next fifteen years, only 3 will have retired from it during the same period.<sup>1</sup>

1 Child-bearing age generally falls in the range 15 to 50 years.

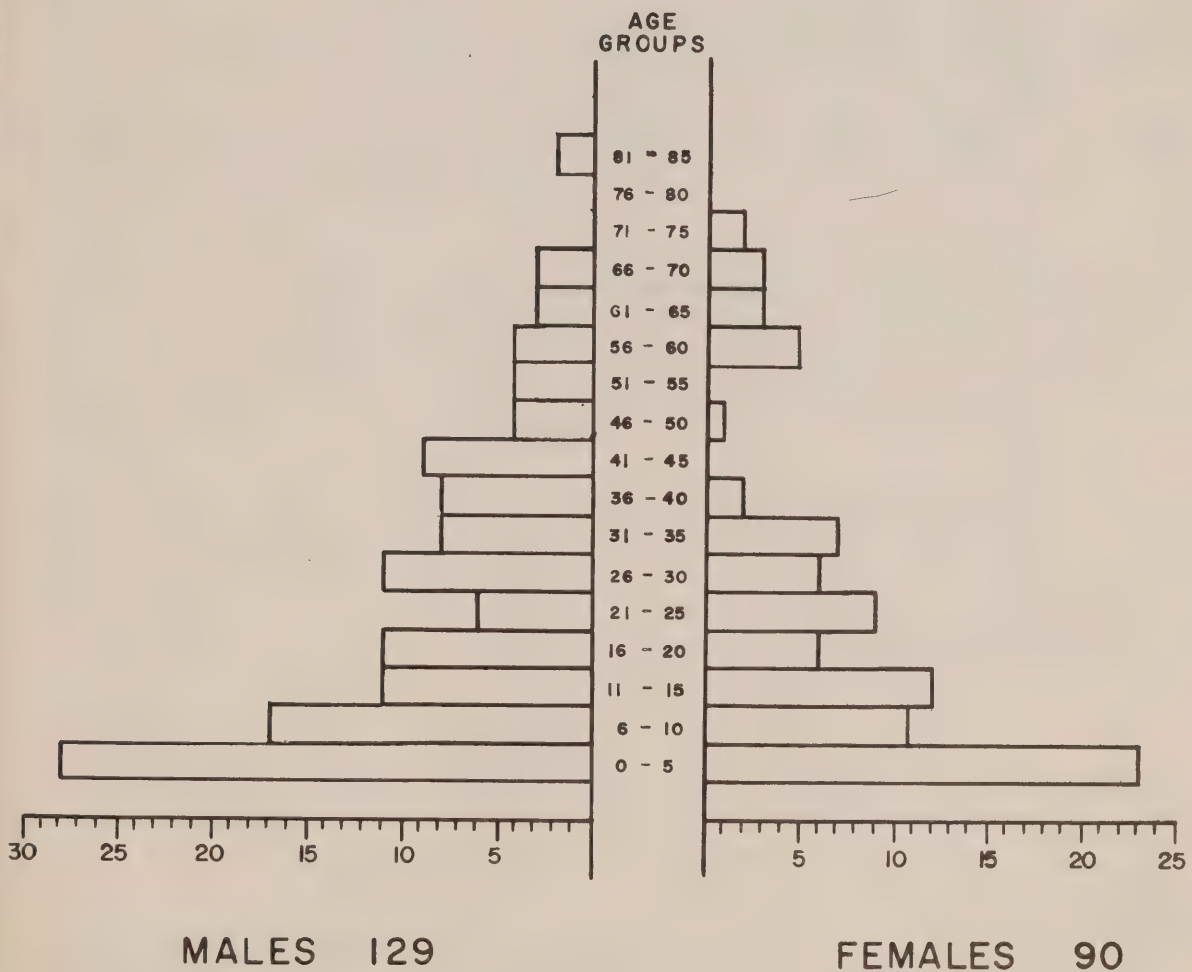
FIG. 3

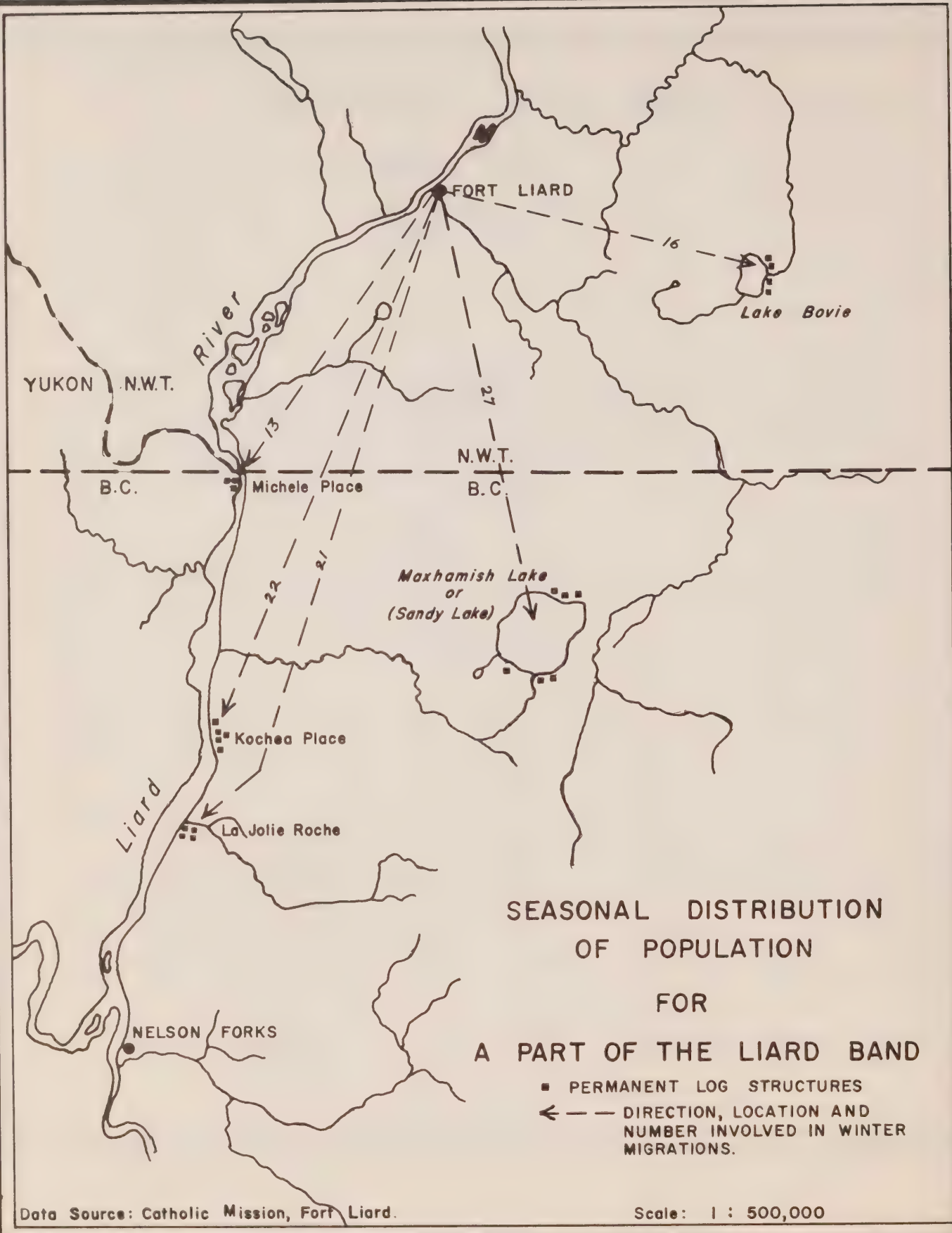
## POPULATION STRUCTURE

## FORT LIARD

(NATIVE POPULATION)

JULY 1968







## Movements

As mentioned earlier in the introduction to this chapter, the Indians associated with Fort Liard are given to seasonal movements on a relatively large scale. These migratory movements are of a semi-nomadic nature and might properly be classed as a remnant of the earlier traditional way of life.

In the early fall of each year approximately 100 individuals, representing some 22 households in the community, migrate to pre-established camps along the Liard River in British Columbia; to Maxhamish Lake in the same Province and Lake Bovie in the N.W.T. A few desultory trips may be made between Liard and the aforementioned locations at certain times for re-supply, but usually the migration lasts throughout the winter and may be equated roughly with the opening and closing of the trapping season.

Permanent inward and outward migration has involved only 22 people over the past ten years, so in terms of this type of movement, the Indian population is relatively unaffected.

## Population Levels and Vital Statistics

Population levels over usefully long periods are elusive values to establish for even the smallest of the settlements. The only recourse to this information is usually through a re-working of certain of the vital statistics, which leaves one with a good appreciation of former population levels but not always an accurate one. When someone has bothered to record these data then their usefulness is naturally improved.

Depending upon religious and ethnic differences, up to four or more agencies can be involved in the recording of population data, e.g., the D.I.A.N.D. on behalf of Treaty Indians; the R.C.M.P. or D.I.A.N.D. on behalf of White and Metis populations and one or more of the Churches on behalf of their followings, irrespective of ethnic affiliation. It is not surprising, therefore, that incongruities and uncertainties are almost invariably met with whenever the statistical aspects of populations are examined.

Table 10, which follows, is a compilation of vital population information for the settlement of Fort Liard over a ten-year period. The population tally for each of the years was arrived at by a working of the natural phenomena of birth and death, influenced further by values for in/out migration supplied from the notes and recollections of Father P. Mary O.M.I., Fort Liard. The table includes both the Native and Metis permanent populations.

TABLE 10POPULATION - VITAL STATISTICS

| Year | Pop. | Marri-<br>ages | Deaths | Rate<br>per /M | Births | Rate<br>per /M | Migration<br>In | Out |
|------|------|----------------|--------|----------------|--------|----------------|-----------------|-----|
| 1957 | 183  | 1              | 8      | 43.7           | 4      | 21.8           | -               | -   |
| 1958 | 179  | -              | 3      | 16.7           | 7      | 39             | -               | -   |
| 1959 | 183  | 2              | 1      | 5.5            | 5      | 27.4           | -               | -   |
| 1960 | 187  | 2              | 6      | 32             | 10     | 53.4           | -               | 1   |
| 1961 | 190  | 2              | 0      | 0              | 3      | 15.7           | 1               | -   |
| 1962 | 194  | 3              | 2      | 10             | 7      | 36.8           | 3               | 1   |
| 1963 | 201  | 1              | 4      | 19.9           | 13     | 64.6           | -               | 4   |
| 1964 | 206  | 3              | 5      | 24.2           | 11     | 53.4           | -               | 3   |
| 1965 | 209  | 1              | 5      | 23.9           | 14     | 66.9           | -               | 3   |
| 1966 | 215  | 2              | 1      | 4.6            | 13     | 60.4           | 2               | 1   |
| 1967 | 228  | 3              | 1      | 4.4            | 9      | 39.4           | -               | 3   |

Data Source: Father P. Mary O.M.I., Catholic Mission, Fort Liard

NAHANNI BUTTE

About 50 miles up the South Nahanni River, near the entrance to the first canyon, resides a family which, for population purposes, will be included under Nahanni Butte. The location is known locally as "Hot Springs" and it will receive further mention elsewhere in the report.

Whites

The total White Population at the time of field work consisted of 5 persons distributed as follows:

Permanent - A settler family of long residence consisting of husband, wife and son. A number of other children belong to the family and resided previously at Nahanni Butte, but they migrated south to attend universities and to take up employment.

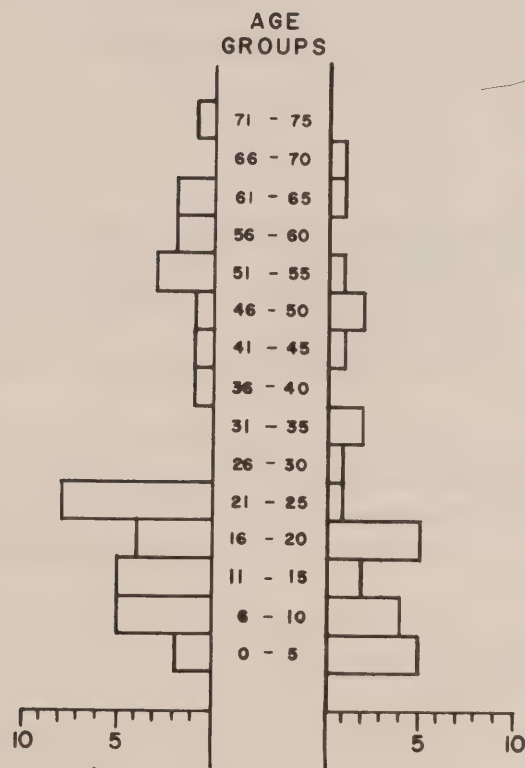
FIG. 4

## POPULATION STRUCTURE

## NAHANNI BUTTE

(NATIVE POPULATION)

JULY 1968



MALES 35

FEMALES 26

A second family consisting of a settler, Indian wife and adopted son reside at Hot Springs.

Floating - The floating element consisted of a school teacher and his wife.

To summarize, therefore, the White population was found to consist of 5 adults, four of whom were permanent residents.

### Indian

The structural diagram (Fig. 4) should provide an immediate appreciation of the structural characteristics of the Nahanni Butte Indian population. Some of these characteristics are summarized below:

|  |   |   |                      |               |
|--|---|---|----------------------|---------------|
| Ratio - males to females               |   |   |                      | <u>1.3: 1</u> |
| Percentage of population under 35 yrs. |   |   |                      | <u>74</u>     |
| "                                      | " | " | between 35 & 65 yrs. | <u>23</u>     |
| "                                      | " | " | over 65 yrs.         | <u>3</u>      |

The population structure of Nahanni Butte seems to lack the broad young base apparent at Fort Liard; however, the summarized data are remarkably similar to those of the latter named settlement. Moreover, calculations show that the young base of 15 years olds and under is very nearly identical in both settlements, i.e., Fort Liard 46% and Nahanni Butte 44.4%.

The striking difference occurs in the youngest strata of the base, i.e., 0 - 5 years. At Fort Liard this element is about 23.3% of the total population, while at Nahanni Butte it is only about 13%. This will have a significant effect on school enrollment in the future and is discussed more fully in Chapter 4.

### Population Levels & Vital Statistics

The level of Indian population has varied only slightly over the ten-year period covered in table 11. The net increase was eight persons.



TABLE 11

POPULATION - VITAL STATISTICS

| Year | Pop. | Marri-<br>ages | Deaths | Rate<br>per /M | Births | Rate<br>per /M | Migration<br>In | Out |
|------|------|----------------|--------|----------------|--------|----------------|-----------------|-----|
| 1957 | 53   | 1              | -      | -              | 2      | 37.7           | -               | -   |
| 1958 | 55   | -              | 2      | 36.3           | 3      | 54.5           | -               | -   |
| 1959 | 56   | -              | 1      | 17.8           | 2      | 35.7           | -               | -   |
| 1960 | 57   | -              | -      | -              | 3      | 52.6           | 1               | -   |
| 1961 | 59   | -              | -      | -              | 1      | 16.9           | -               | 1   |
| 1962 | 59   | -              | -      | -              | 3      | 50.8           | -               | 3   |
| 1963 | 59   | -              | -      | -              | -      | -              | -               | -   |
| 1964 | 59   | -              | -      | -              | 3      | 50.8           | -               | -   |
| 1965 | 62   | -              | 1      | 16             | 1      | 16             | -               | -   |
| 1966 | 62   | -              | 1      | 16             | 1      | 16             | -               | 1   |
| 1967 | 61   | 2              | -      | -              | 4      | 65.5           | -               | 1   |

Data Source: Catholic Mission, Fort Liard

TROUT LAKE

The population of Trout Lake is the most isolated and unattended in the Lower Liard Region. It is entirely Indian in composition and is undoubtedly the most homogeneous of all the populations.

Two households consisting of three persons are located at the north end of Trout Lake (the lake proper) and are considered part of the local community. The population structure appears in fig. 5. Some of its characteristics are discussed below:

|  |           |
|--|-----------|
| Ratio - males to females                 | 1 : 1.1   |
| Percentage of population 35 yrs. & under | <u>70</u> |
| " " " between 35 & 65 yrs.               | <u>20</u> |
| " " " over 65 years of age               | <u>9</u>  |

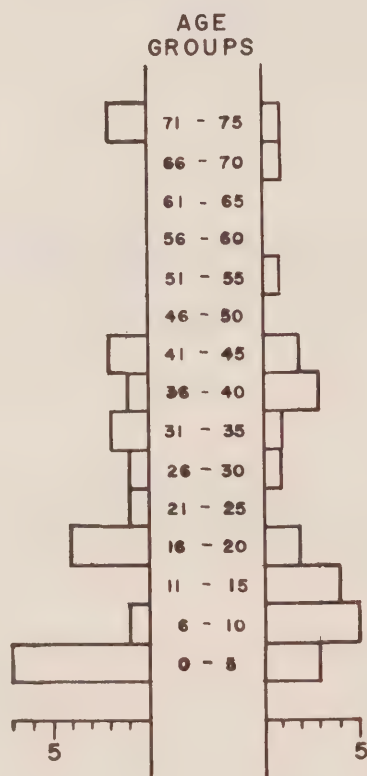
If we isolate the three Indians living at the north end of the lake, four families make up the whole of the population of Trout Lake settlement. All are genealogically closely associated.

FIG. 5

## POPULATION STRUCTURE

## TROUT LAKE

(NATIVE POPULATION)  
JULY 1968



MALES 21

FEMALES 23

Movements

Inward and outward migration is negligible and has affected only one person in the last ten years. In spite of the many material disadvantages facing the population due to its isolation, a net gain of about 35% has resulted in the population since 1957.

TABLE 12POPULATION - VITAL STATISTICS

| Year | Pop. | Marri-<br>ages | Deaths | Rate<br>per /M | Births | Rate<br>per /M | Migration |     |
|------|------|----------------|--------|----------------|--------|----------------|-----------|-----|
|      |      |                |        |                |        |                | In        | Out |
| 1957 | 31   | 1              | 1      | 32.3           | 2      | 64.5           | -         | -   |
| 1958 | 32   | -              | -      | -              | 1      | 31.2           | -         | -   |
| 1959 | 33   | -              | -      | -              | 2      | 60.6           | -         | -   |
| 1960 | 35   | 1              | 1      | 28.5           | 1      | 28.5           | -         | -   |
| 1961 | 35   | -              | 1      | 28.5           | 1      | 28.5           | -         | -   |
| 1962 | 35   | -              | 1      | 28.5           | 2      | 57             | -         | -   |
| 1963 | 36   | -              | -      | -              | -      | -              | -         | -   |
| 1964 | 36   | -              | -      | -              | 3      | 83             | -         | -   |
| 1965 | 39   | -              | -      | -              | -      | -              | -         | -   |
| 1966 | 39   | -              | -      | -              | 3      | 76.9           | -         | -   |
| 1967 | 42   | -              | 1      | 23.8           | 2      | 47.6           | -         | 1   |

Data Source: Catholic Mission, Fort Liard

The net population gain for the ten-year period amounted to 11 persons.

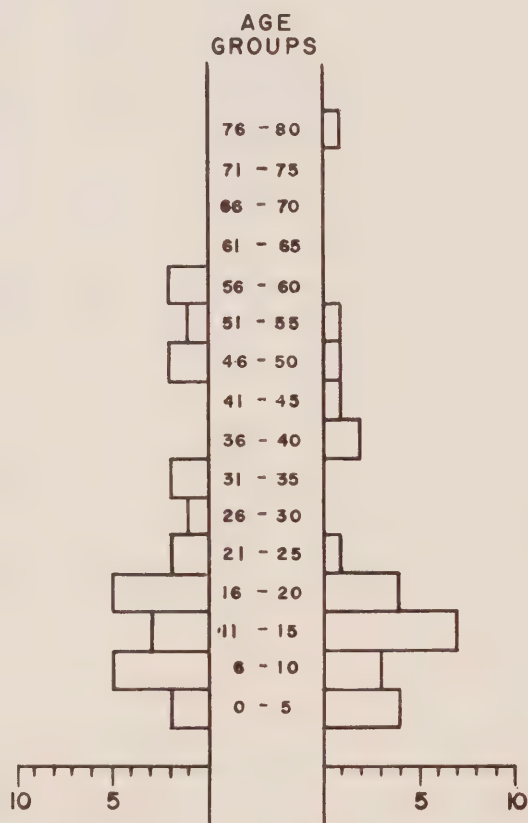
JEAN MARIE

The Jean Marie population was all Indian, in a closely knit grouping of four families. The population is primarily settlement-based and depends almost entirely on the cooperative saw-mill for its livelihood.

FIG. 6

## POPULATION STRUCTURE

JEAN MARIE

(NATIVE POPULATION)  
JULY 1968

MALES 25

FEMALES 25



White (Floating Element) - This consisted of a school teacher, normally in residence for all but two months of each year.

### Indian

The structuring of the Indian population was quite similar to that of the two small settlements preceding this one. (fig. 6) The structural data appear as follows:

|  |              |
|--|--------------|
| Ratio - males to females                   | <u>1 : 1</u> |
| Percentage of population 35 yrs. and under | <u>78</u>    |
| " " " between 35 and 65 yrs.               | <u>20</u>    |
| " " " over 65 yrs.                         | <u>2</u>     |

### Movements

Precise information on inward and outward migration could not be obtained, but it is known to have been negligible over the past ten years.

### Population Levels & Vital Statistics

Unfortunately, these data were recorded at Fort Simpson for the whole of Band 09 and it was impossible to work them back over ten years and, at the same time, isolate individuals by community. As a matter of interest, these lumped statistics are shown under Fort Simpson.

### FORT SIMPSON

Fort Simpson is characterised by a heterogeneous permanent population consisting of the three ethnic groups, i.e., Indian, Metis and White, and a quite large floating-element of White residents.

Superimposed on this milieu, but not shown in the diagram, fig. 2, is the occasional appearance of numbers of people in the settlement connected with nearby exploration projects. The latter are usually in the settlement for only very short periods and have been included in the populations of the temporary centres with which they would normally be associated.

A diagrammatic representation of population structure for the separate ethnic groups forming the permanent population of Fort Simpson is contained in each of three diagrams included in this section. These are figures 7, 8 & 9.

The floating population is amenable to a breakdown in terms of adults and children, and it is of interest, as well, to identify this particular population with the several agencies responsible for its presence in the community.

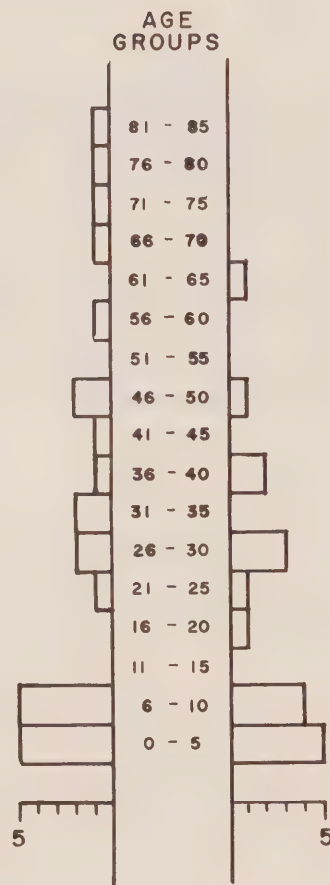
FIG. 7

## POPULATION STRUCTURE

## FORT SIMPSON

(WHITE POPULATION)

JULY 1968



MALES 24

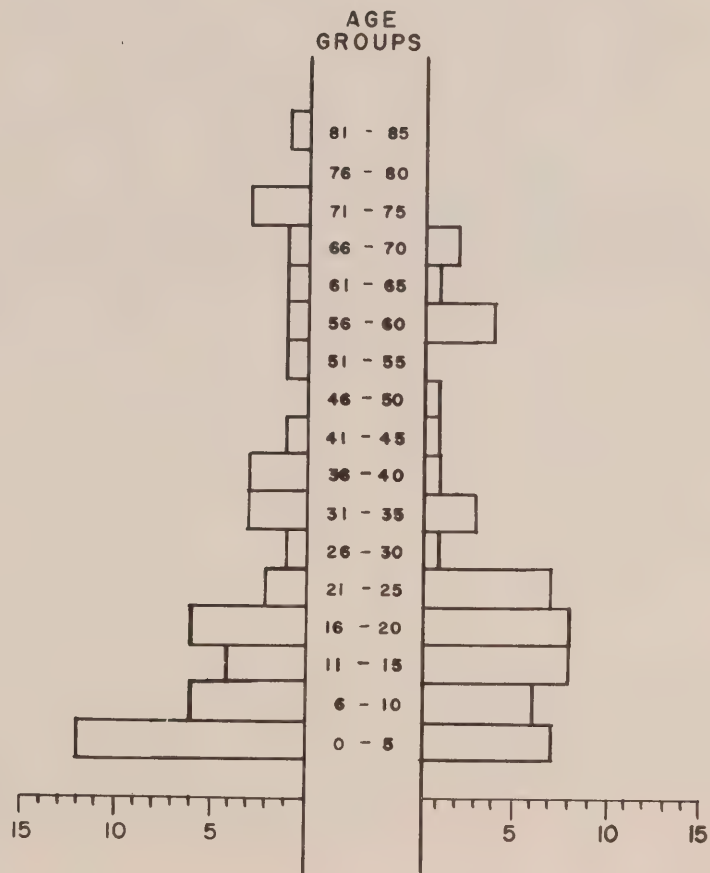
FEMALES 21

FIG. 8

## POPULATION STRUCTURE

## FORT SIMPSON

(METIS POPULATION)  
JULY 1968

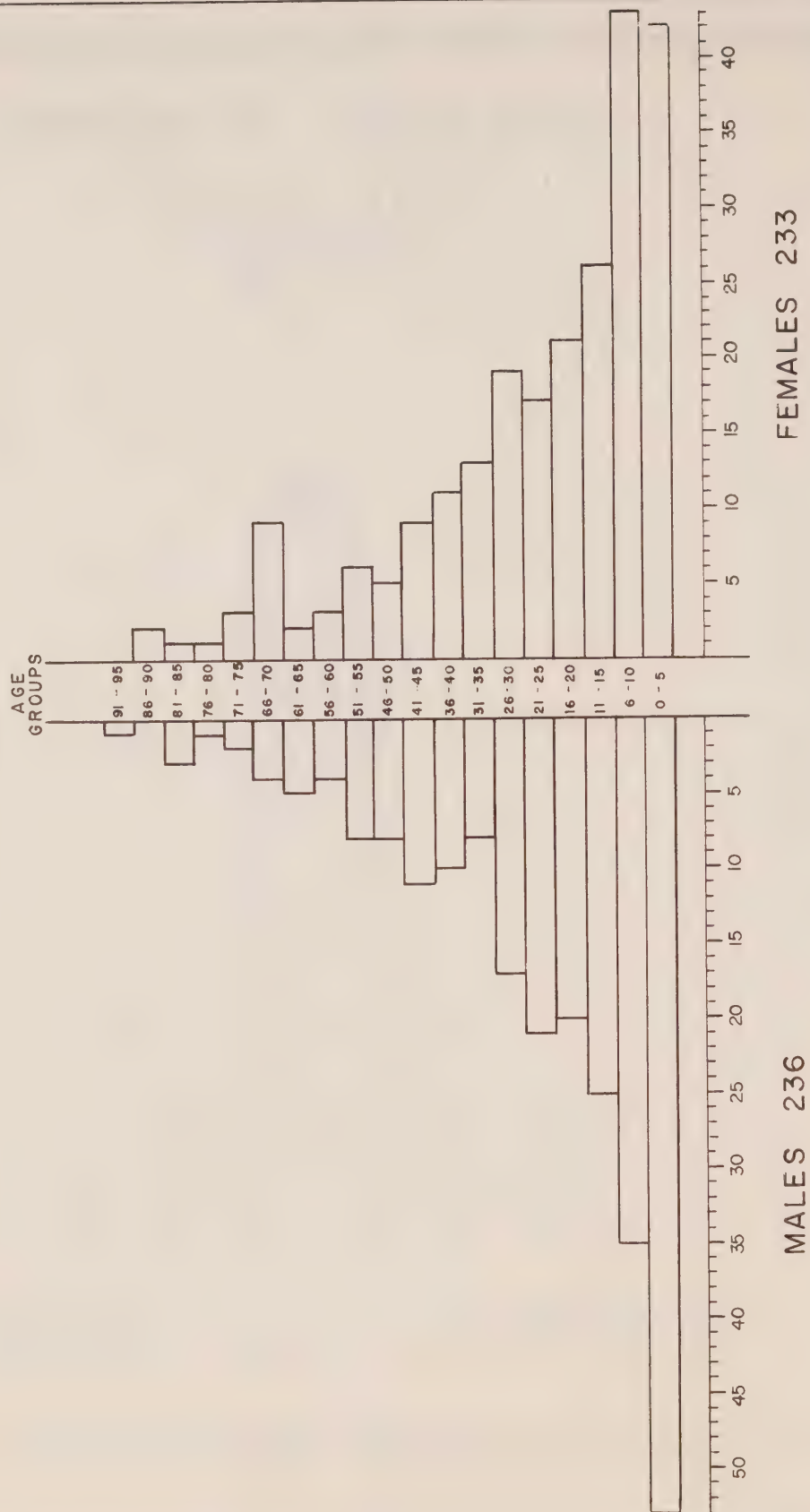


MALES 46

FEMALES 50

FIG. 9

POPULATION STRUCTURE  
FORT SIMPSON  
(NATIVE POPULATION)  
JULY 1968





The floating population is of great significance in the local economy, which aspect will be discussed later in the report. Similarly, the agencies are of importance in the economy and to bring both together at this time will serve as a preliminary introduction.

It should also be remembered that the floating element is subject to change. Approximately the same numbers have been present for some time, but the structuring is constantly being affected by exchanges in personnel and their families.

White (floating element)

| <u>Agency</u>             | <u>Adults</u> | <u>Children</u> | <u>Total</u> |
|---------------------------|---------------|-----------------|--------------|
| D.I.A.N.D.                | 38            | 26              | 64           |
| D.P.W.                    | 2             | 3               | 5            |
| D.O.T.                    | 20            | 31              | 51           |
| N.C.P.C.                  | 26            | 23              | 49           |
| R.C.M.P.                  | 4             | 1               | 5            |
| D.N.H.W.                  | 4             | -               | 4            |
| Catholic establishment    | 19            | -               | 19           |
| Anglican establishment    | 5             | 4               | 9            |
| Pentecostal establishment | 4             | 3               | 7            |
| Arctic Air                | 5             | -               | 5            |
| Other                     | <u>2</u>      | <u>-</u>        | <u>2</u>     |
| Totals                    | 129           | 91              | 220          |

NOTE: D.I.A.N.D. includes Mackenzie Forest Service, Game Branch and school staff. Catholic establishment includes St. Margaret's Hospital and Catholic Hostel. Anglican establishment includes the Anglican Hostel. D.O.T. includes both the airport and property management divisions.

Metis (floating element)

One Metis was working as a nursing assistant in the hospital during the course of the survey.

## Permanent Population

White - These people have had a fairly long association with the Fort Simpson area; they, or their parents, having settled there in the 1920's or soon thereafter.

Most are today associated with small businesses in the settlement, although, in earlier years, many were engaged in trapping.

Metis - The Metis population is second to the Indian in size and about twice as large as the White.

Indian - The Indians form the broad population-base at Fort Simpson and some of its structural characteristics appear as follows:

|  |             |
|--|-------------|
| Ratio - males to females                 | about 1 : 1 |
| Percentage of population 35 yrs. & under | <u>76.7</u> |
| " " " between 35 & 65 yrs.               | <u>17.5</u> |
| " " " over 65 yrs. of age                | <u>5.7</u>  |

Nearly 41% of the present female Indian population is of child-bearing age. Over the coming fifteen years 111 additional females will have attained child-bearing age, but only 25 will have retired from it. This represents a net gain of about 86 individuals, or 89%, in this particular category.

Accurate information regarding early Native populations of Fort Simpson could not be obtained due chiefly to the official system of Band rather than settlement census. Evidence of this is offered by Ronald Cohen (1962: p. 30) who evidently did not, or could not, separate the Fort Simpson settlement population from the Fort Simpson area population. In this, however, he cannot be blamed because the difficulties of doing so are considerable, if not impossible.

## Movements

It was not possible to obtain information pertinent to inward and outward migration. This aspect of population does not appear to have been recorded in comprehensive form by any authority.

## Population Levels & Vital Statistics

The decision to categorize the populations of the Lower Liard Region encounters unavoidable conflict with many of the recording methods in use. For example, in the recording of vital statistics for the non-Indian populations, White and Metis groups are combined, and, moreover, floating and

permanent populations are combined as well. In these circumstances, no attempt was made to break-down these data into the rather detailed components it was possible to achieve with the Indian population.

TABLE 13  
POPULATION - VITAL STATISTICS  
FORT SIMPSON BAND (Band 09)

| <u>YEAR</u> | <u>POPULATION</u> | <u>MARRIAGES</u> | <u>BIRTHS</u> | <u>RATE p/m</u> | <u>DEATHS</u> | <u>RATE p/m</u> |
|-------------|-------------------|------------------|---------------|-----------------|---------------|-----------------|
| 1960        | 484               | -                | 31            | 64              | 6             | 12.4            |
| 1961        | 502               | 1                | 24            | 47.8            | 6             | 11.9            |
| 1962        | 510               | 8                | 22            | 43.1            | 1             | 2               |
| 1963        | 524               | 3                | 7             | 13.3            | 3             | 5.7             |
| 1964        | 529               | 3                | 18            | 34              | 6             | 11.3            |
| 1965        | 549               | 2                | 24            | 43.7            | 7             | 12.7            |
| 1966        | 566               | 1                | 20            | 35.3            | 3             | 5.3             |
| 1967        | 581               | 2                | 22            | 37.9            | 4             | 6.9             |

Data Source: D.I.A.N.D., Fort Simpson

NOTE: The table unavoidably includes data pertinent to the entire population of Jean Marie and other locations lower down the Mackenzie, as well as to parts of the populations of Nahanni Butte and Trout Lake.

### TUNGSTEN

With the exception of one Indian, Tungsten possesses a homogeneous all-White population. As shown in the diagram, fig. 2, the population is subject to a seasonal fluctuation resulting from a cut-back in mining operations. It is therefore larger in the summer than in the winter.

The range usually encountered is approximately 123 - 169 persons, and the difference is accounted for by an exodus of single males on the annual cessation of mining. The basic population is assumed to equal 123. Of this number there are roughly 27 women, about 52 children and 44 adult males. Many of the children are attending higher grade schools on the outside and return to the location only in the summer. They are, nevertheless, included in the total shown above.

### POINTED MOUNTAIN

Only two females were noted in the population of the main location at Pointed Mountain. The balance consisted of males engaged in development tasks in the vicinity. No Natives were resident at Pointed Mountain.

The population is subject to wide fluctuation in numbers due to cut-backs in certain operations. No children were known to be included in the population.

### PRAIRIE CREEK

The population shown in the diagram for Prairie Creek includes one female and one child. The balance consists of a male work-force, subject to the same fluctuations prescribed for Pointed Mountain.

### CAMSELL BEND

This population is subject to considerable movement within a specified exploration area. It may be severely reduced in numbers during the winter, or may disappear altogether until the following spring. The composition is basically White, with casual Natives being drawn from nearby centres of permanent residence. Women rarely if ever, make up part of the population which, itself, is subject to a wide fluctuation in numbers resulting from a high turn-over.

### TROUT RIVER

The Trout River population is connected with road construction and is of varied composition as shown in the diagram. It is all male and is also subject to fluctuation due to a high turn-over and a cut-back on winter operation.

### SUMMARY

The Lower Liard Region is sparsely populated by the three ethnic groups. The author believes it is rather important to attempt at least a degree of population classification and has accomplished this in the manner illustrated in the diagram, fig. 2.

There exists a marked correlation between populations and settlement types which permits reasonable labour mobility categories to be assigned to the several populations recognized in the region. The lowest mobility factor is assigned to the permanent Indian, and the highest to those populations associated with short, medium or long-term development projects, presently based on natural resources.



Of the permanent populations, Forts Liard and Simpson possess viability in terms of sustained growth in numbers. Nahanni Butte, Trout Lake and Jean Marie possess exceptionally small populations with poor viability. The most primitive, isolated and unattended population resides at Trout Lake.

The level of acculturation so far achieved by the Indian must be considered low, even when compared to the standard achieved by some Eskimo communities. Proficiency in the spoken English is predominantly in the younger age groups and its largest manifestation is to be found at Fort Simpson. This, undoubtedly, is a result of the population being more firmly entrenched in a settlement life, a vastly superior school complex and a relatively large element of resident Whites.

Population magnitudes in the summer of 1968 are summarized as follows:

associated with permanent centres, Whites 279; Metis 109; Indians 845

associated with semi-permanent centres, Whites 152-206; Indians 1

associated with temporary centres, Whites 44-87; Metis 5-7; Indians 11-31

The grand totals were, therefore: Whites 472-572; Metis 114-116; Indians 857-877. Differences will be noted between the numbers of Indian and Metis populations of the permanent settlements and the numbers of each shown in the grand totals above. This is because all of the Indians employed at Trout River, and about one half those employed at Camsell Bend, normally reside outside the Lower Liard Region.



## CHAPTER 4

### POPULATION CENTRES

#### INTRODUCTION

The various population centres have been adequately classified in the companion diagram, fig. 2, included with the preceding chapter. As was done in Chapter 3 concerning the populations in the Lower Liard Region, it is desirable to discuss certain factors which are more or less common, or affect the population centres nearly equally, throughout the region before proceeding to examine each centre on an individual basis. By doing this, it is hoped that a considerable amount of repetition will be avoided.

While having said certain factors affect the population centres nearly equally, it is necessary to add in the same breath that some centres are not nearly so affected by some factors as are other of the centres. For example, education might be expected to be insisted upon in most centres where children of school age reside, but, on the other hand, the Territorial administrative authority does not yet reach into any but the permanent settlements.

The field work and much of the report preparation was accomplished during a time when the Federal Government had actively begun to transfer certain of its responsibilities to the newly formed Territorial Government. The author could not hope to be able to place the various official functions of the time into their present newly-formed categories, a process still in progress, so has of necessity retained the official designations and Government affiliations that existed at the time of the survey.

#### Government Authorities

Care should be taken to appreciate that the mention of area or regional authority implies political boundaries that do not necessarily conform to the theoretical boundaries of the Lower Liard Region, which are predicated on geographic and economic factors alone.

#### D.I.A.N.D.

Administration - The Fort Simpson Administrative Area, as it is officially known, encompasses the whole of the Lower Liard Region and extends north almost to Fort Norman on the Mackenzie River.

An Area Administrator is based at Fort Simpson and responsibility extends upward through the Regional Administrator, thence to the Administrator of the Mackenzie, followed by the Northern Administration Branch of D.I.A.N.D. in Ottawa.

Downward responsibility, i.e., at the settlement level, is usually vested in school teachers or other Government employees who, as a rule, reside temporarily in the settlements.

The Area Administrator's responsibility does not appear to extend to the semi-permanent or temporary population centres indicated in fig. 2. These are company oriented and financed, and are usually administered by a resident representative of the company concerned. This particular state of independency, however, does not apply to all fields of authority present in the region, as will be shown later.

Education - The lowest link in authority over the education system is at the regional level and rests with the Regional Superintendent. His responsibility is to the District Superintendent. Both come under the Education Division, D.I.A.N.D.

Downward responsibility naturally extends to the teachers in the individual settlements; but in some cases, as at Fort Simpson, authority may be delegated to the senior principal over establishments in the smaller local settlements. The principal at Fort Simpson assumes certain administrative responsibilities toward the schools at Nahanni Butte and Jean Marie, for example.

The D.I.A.N.D. operates a system of compulsory Federal Day Schools in those settlements where it is reasonably practicable to do so. In the Lower Liard Region such schools are established in Fort Liard, Nahanni Butte, Jean Marie and Fort Simpson. A school does not exist at Trout Lake for rather obvious reasons, and only one of the remaining semi-permanent centres, Tungsten, is presently settled or populated sufficiently by children to warrant a school.

In addition to the Federal Day School at Fort Simpson, the D.I.A.N.D. has installed a large hostel complex to accommodate children from the outlying settlements who are to continue their education beyond grade six level. The complex is divided between the Catholic and Anglican Churches for purposes of administration and supervision.

Electricity - In the smaller settlements such as Fort Liard, Nahanni Butte and Jean Marie the power generation facilities, distribution systems and their operation are the direct responsibility of the D.I.A.N.D. but, in Fort Simpson, this responsibility falls on the Northern Canada Power Commission, a Crown company closely allied to D.I.A.N.D. Trout Lake is without power facilities of any sort, and the semi-permanent and temporary centres are responsible for fulfilling their own power requirements.



Protection of Forests - The Mackenzie Forest Service is directly responsible for forest fire-control in the Mackenzie District. Its area headquarters is located at Fort Simpson and its zones of responsibility fall within the Fort Simpson Administrative Area, but do not conform to it in size (map 10). The Service is discussed more fully in the following chapter on the natural resources.

Protection of Fauna - The Game Branch of D.I.A.N.D. is responsible for the protection of fauna and the regulation of trapping and hunting. A game officer is based at Fort Simpson and the Lower Liard Region is included in his area of responsibility. The game officer is responsible to the Superintendent of Game at Fort Smith. (Now at Yellowknife)

R.C.M.P. officers are generally appointed ex-officio game officers throughout the north. At Fort Liard the R.C.M.P. officer fulfills many of the functions of the official representative at Fort Simpson because of the considerable distance separating the two locations.

Administration of Lands, Minerals, Water and Forests - This is the responsibility of the Resources & Economic Development Group, D.I.A.N.D. A representative of the Group is positioned permanently at Yellowknife. The Lower Liard Region falls in its entirety within the Nahanni Mining District, with the recording office for the district located at Watson Lake in Yukon Territory.

### D.N.H.W.

Public health in the north is the responsibility of the aforementioned Department. The Lower Liard Region comes directly under the regional D.N.H.W. headquarters at Edmonton. Field responsibility is vested in the doctor or nurse assigned to a particular population centre.

To fulfill its function the Department maintains a system of nursing stations in those outlying centres where the population is sufficiently large to warrant it. In the Lower Liard Region stations are installed both at Fort Simpson and Fort Liard. At the remainder of the permanent population centres lay dispensers are appointed by the Department to provide minor medical assistance. Serious cases would normally be moved to the larger medical centres like Yellowknife or Edmonton by scheduled or charter aircraft.

The semi-permanent population centre of Tungsten maintains its own small hospital, while the remainder, including the temporary centres, rely on their own first-aid facilities and removal by aircraft in serious cases.

R.C.M.P.

Responsibility for policing moves from the regional headquarters at Fort Smith down to the area level. In the Lower Liard Region two such areas of responsibility are established. Their common boundary divides the study region in an east/west direction roughly at Nahanni Butte. One of them includes the centres of Fort Simpson and Jean Marie, Prairie Creek and the two temporary centres, while the second area includes Fort Liard, Nahanni Butte, Trout Lake, Pointed Mountain and Tungsten. Detachments are based at Fort Liard and Fort Simpson only, and the other centres are covered by periodic patrols, or as often as may be required.

D.P.W.

Accommodation - Responsibility for D.I.A.N.D. accommodation is vested in this Department which has its regional headquarters at Edmonton. Besides assigning accommodation, D.P.W. is normally responsible for major building maintenance; this is extended to D.O.T. and the R.C.M.P. by mutual arrangement. This accommodation responsibility of the D.P.W. appears to be restricted to Fort Simpson and does not extend to the other settlements.

Construction - D.P.W. assumes contractual responsibility for all major road construction and carries out preliminary route surveys as well.

D.O.T.

The responsibilities of this Department in the region are clear enough. It would be well to note, however, that of all the landing strips in the region only the one at Fort Simpson falls directly under the control of D.O.T. Other activities of D.O.T. were discussed earlier under communication systems.

General

It is not the intention in this chapter to discuss in detail the numerous building complexes existing in the several population centres. The settlement plans appearing as appendices to this report are included for the express purpose of illustrating the approximate location and size of each building.

With regard to Native housing, however, detailed data additional to what the plans are able to convey are required. These are presented in tables appearing in the text where appropriate.

## FORT LIARD

### PHYSICAL ARRANGEMENT

Fort Liard is elongated in a north-south direction along the right bank of the Liard River. The core area is occupied by the H.B. Co. and the Government establishment. The Native dwellings are located at either extremity and a few others are situated on the left bank of the river, directly opposite the Catholic Mission buildings.

This particular settlement arrangement is historical, being typical of "fort" communities in which the trading post was nearly always barricaded and Native habitation evolved on the outer perimeter.

A floating dock is located directly in front of the school and this is used as a tie-up for float aircraft and small vessels. River barges generally drive on to the shallows directly below the river bank and tie up to a tree or stake while unloading. The landing strip is located immediately to the rear of the settlement.

### ADMINISTRATIVE & GENERAL

#### Administration

The responsibility for local administration falls upon the power-plant operator, an employee of D.I.A.N.D. His duties include the supervision of public works projects authorized by the area authority at Fort Simpson, perusal of applications for social assistance, recording of the consumption of fuels and electricity and the recording of certain vital population statistics.

#### Law Enforcement

An R.C.M.P. detachment was established at Fort Liard in 1927. A special Indian constable is usually attached to the post to act as interpreter and to provide other assistance in policing duties. The R.C.M.P. officer normally accepts the responsibility of lay dispenser to the community in the absence of a D.N.H.W. nurse. Such was the case in the summer of 1968. It should be noted in this connection that the Catholic Mission, for many years, acted as lay dispenser to the community.

The most troublesome area of law enforcement is concerned with violations of the Acts, Ordinances and Codes pertaining to liquor. A summary of violations for roughly a five-year period is shown in table 14.

TABLE 14

| Year             | Violations | Remarks                             |
|------------------|------------|-------------------------------------|
| 1963             | 30         |                                     |
| 1964             | 39         | (1 charged under the Criminal Code) |
| 1965             | 65         | (4 " " " " " )                      |
| 1966             | 39         | (3 " " " " " )                      |
| 1967             | 16         |                                     |
| 1968 (half year) | 4          |                                     |

Of a total of 201 charges, 8 were laid under the Criminal Code. The balance were less serious, consisting chiefly of such infractions as intoxication, brewing without a permit, minor consuming, etc. The tally is for the Fort Liard area of jurisdiction and not for that settlement alone.

---

Data Source: R.C.M.P., Fort Liard, N.W.T.

### Health

A modern nursing station of the D.N.H.W. is located next to the R.C.M.P. in the settlement. It possesses a number of beds and assorted medical equipment, and includes a nurse's residence. A large and well-stocked dispensary is located in the basement. Certain drugs requiring refrigeration are stored in a domestic-type refrigerator.

In general, the health of the community is good. Thirty-four deaths were recorded over the period 1957-1967, and measles was the greatest killer, according to cause. It accounted for six deaths in 1957, but no deaths due to this disease have been recorded since that time. Four deaths for causes unknown were recorded over the same period, and occurred in the bush away from immediate aid. The rest of the deaths were in smaller numbers and attributable to common diseases or injuries.

### AIRCRAFT LANDING FACILITIES

Some comment made earlier in the report alluded to the generally poor condition of landing strips in the permanent population centres. The strip at Fort Liard is no exception to that earlier statement. The length of the strip is approximately 2900 ft., the width of clearing is 200 ft. and the theoretical width of the strip proper is 100 ft.



The surface is a sandy silt with perhaps a mixing of fine clay. The least amount of precipitation converts the surface into "gumbo" and renders the strip unuseable to any aircraft. This soft condition persists for many days following rains due to poor drainage and the moisture retention characteristics of these soils.

Aircraft, landing when the strip is in this particular state, often have to be jacked-out. Moreover, when the surface is soft, the effective length of the runway is severely reduced due to excessive drag on the aircraft.

Aviation fuel is the responsibility of the aircraft operator who must arrange to have fuel barged in if sustained operations are contemplated in the region. Operators frequently borrow on a replacement basis but no large amount of aviation fuel is ever present in the settlement.

### ROADS

There are slightly over two miles of roadways in Fort Liard. About one mile consists of roads which have been ditched and lightly gravelled. The remaining mile is taken up by roadway in front of the settlement close to the river bank. This latter thoroughfare is the most used in the settlement and is in the poorest condition. No grading has been carried out on it and in wet weather it becomes all but impassable.

### POTABLE WATER

The water supply of the community is obtained from seven shallow wells. These are dug wells cribbed with timber. Four of the wells are located close to Government buildings; one is located in the basement of the Catholic Mission; another is located in the newly constructed bath house and the remaining two are in the Indian parts of the settlement. The latter two wells are enclosed by well-houses and the water must be carried to the dwellings. All others are hooked to pressure systems in the various buildings they service.

### SEWAGE

The Government buildings and the Catholic Mission dispose of raw sewage through septic systems employing buried tanks and tile fields. The Indian dwellings are serviced by outdoor privies.

### GARBAGE

Garbage is a Government service and is collected on a regular basis by an Indian under contract for services and equipment. The contractor uses a farm-wagon hauled by a tractor or, alternatively, a small pick-up truck. The refuse is disposed of at a site located about 1000 ft. beyond the native section at the north end of the settlement.

## ELECTRICITY

Electrical generating equipment consists of three 50 KVA diesel driven generators which replaced older equipment in the Fall of 1965. One generator is in operation in periods of low-load and a second unit is brought into service during periods of peak load. The third unit alternates with the other two so at least one unit is always available for stand-by.

All Government, Catholic Mission and H.B. Co. buildings are hooked up to the pole-suspended electrical distribution system. Only 5 of the approximately 37 Indian occupied buildings are receiving electricity, but some plan to take advantage of the service as electrical hardware becomes available. The high cost of power is expected to keep many from taking advantage of the service.

## EQUIPMENT

Fort Liard is equipment starved. The amount of hardware in the settlement for carrying out earth moving tasks and heavy maintenance generally is much less than is found around some of the smaller rural farms. In addition to the few items listed below is an assortment of small power and hand tools.

### D.I.A.N.D. Owned Equipment

D2 Caterpillar Tractor (used)  
Massey Ferguson Farm Tractor  
Farmall Wagon  
Small Cement Mixer

### Native Owned Equipment

Massey Ferguson Tractor  
Farm Wagon  
Chevrolet Pick-up, 1/2 ton, 1952

Road grading is carried out by towing three or four large timbers weighted with rocks. Maintenance on the landing strip is not practicable with the equipment at hand.

## EDUCATION

Education facilities at Fort Liard consist of a one classroom Federal Day School/residence which was constructed in 1955. From that year until 1961 a welfare teacher was in residence. Following this, a teacher of the Education Division, D.I.A.N.D., was placed in the settlement each year.

The building has a large basement which contains storage areas, furnace room and a large open space for recreation purposes. The ground floor contains, besides the classroom, a five-room apartment for the teacher and his family. A large office is located in one end of the building and could, if need be, handle any reasonable overflow in enrollment. The seating capacity of the present classroom is approximately 25.

Since 1961 the school has been teaching kindergarten along with all grades up to and including six. In two of the school years grade seven was also taught. Enrollment and other pertinent data are given in table 15 which follows:

TABLE 15  
ENROLLMENT - FORT LIARD F.D.S.

| Year    | Enrol. | K  | 1  | 2 | 3 | 4 | 5 | 6 | 7 | Tcher.<br>Days | Attendance<br>Poss. | Actual |
|---------|--------|----|----|---|---|---|---|---|---|----------------|---------------------|--------|
| 1961/62 | 21     | 2  | 6  | 4 | 4 | 3 | 1 | 1 |   | 193            | 4053                | 2631   |
| 1962/63 | 27     | 4  | 6  | 3 | 5 | 4 | 3 | 1 | 1 | 193            | 5211                | 3491   |
| 1963/64 | 14     | 2  |    | 3 | 4 | 3 | 1 | 1 |   | 168            | 2352                | 2318   |
| 1964/65 | 17     | 4  | 1  | 3 | 3 | 1 | 4 | 1 |   | 194            | 3298                | 2023   |
| 1965/66 | 26     |    | 12 |   | 6 | 4 | 2 | 2 |   | 192            | 4992                | 2377   |
| 1966/67 | 30     | 13 |    |   | 6 | 6 | 4 |   | 1 | 199            | 5970                | 1860   |
| 1967/68 | 25     | 6  | 8  | 3 | 3 | 3 |   | 2 |   | 193            | 4825                | 2078   |

Source: Attendance records Fort Liard.

Under attendance, the "possible" column indicates the attendance it was possible to achieve according to teacher days and enrollment. The effects of the migratory pattern of the population on schooling is all too evident in the record of attendance. The average effective annual attendance over the seven-year term was roughly 54% of the possible attendance. The lowest attendance record was achieved in the year 1966/67 with 34%. The best full attendance year was 1962/63 with 67%.

In this connection, attention is drawn to year 1963/64 which shows nearly 100% attendance, but the records for the first semester, only, were available and had they been available for the balance of the school year, as well, they would undoubtedly have shown the effects of migration as in other years.

The data in the enrollment table shown above include Metis and White children as well as Indian. A further table is required, therefore, before Indian attendance can be placed into proper perspective. This is shown on the following page.

TABLE 16

ATTENDANCE - FORT LIARD F.D.S.

| Year    | Ethnic Enroll. |       |       | Actual Attendance | Percent              | Indian Attendance |        |
|---------|----------------|-------|-------|-------------------|----------------------|-------------------|--------|
|         | Ind.           | Metis | White |                   | Applicable To Indian | Possible          | Actual |
| 1961/62 | 15             | 3     | 3     | 2631              | 60                   | 2895              | 1579   |
| 1962/63 | 18             | 4     | 5     | 3491              | 67.2                 | 3471              | 2347   |
| 1963/64 | 14             | ?     | ?     | 2318              | 72                   | 2352              | 1669   |
| 1964/65 | 13             | 4     | -     | 2023              | 62                   | 2522              | 1254   |
| 1965/66 | 22             | 4     | -     | 2377              | 69                   | 4224              | 1640   |
| 1966/67 | 27             | 3     | -     | 1869              | 60                   | 5373              | 1121   |
| 1967/68 | 23             | 2     | -     | 2078              | 81                   | 4439              | 1683   |

Data Source: Attendance records, Fort Liard

A working of the above attendance data reveals that the true Indian attendance record over the period averages 40% or less, depending on whether one chooses to consider the part-record year 1963/64. The Metis and White attendance throughout the same period averaged virtually 90%.

One can hypothesize from the structural and enrollment data that roughly 53 children of Indian and Metis origin will attain the age of six years by approximately the year 1973 and will, theoretically, enter the local school system.

However, over the same period only 11 children will have passed out. The latter assumes that the 11 referred to will complete all successive grades. In practice, there is the drop-out rate to be considered but, even so, the implications of classroom accommodation are amply clear.

### THE CHURCH

The population of Fort Liard is predominantly Catholic. As mentioned elsewhere in the report, the Catholic mission is long established in Fort Liard, dating back to the middle 1800's. The first Church/residence was built in 1863. This was replaced about 1905 by a new building which, itself, was structurally modified in 1953. The mission complex is located at the south end of the settlement, well removed from the administrative and commercial core.

The resident priest also includes in his parish the settlements of Nahanni Butte and Trout Lake. These are visited on a rotation basis but, because of access difficulties, Trout Lake better fits a winter schedule when a dog team can be used for travel. Each of the latter settlements has a small Church, and also a residence for the priest.



NATIVE HOUSING

With the exception of a very few houses of frame, or partially frame, construction, all native dwellings are constructed of logs obtained from the local forest. Table 17 is introduced for the purpose of showing some of the details concerning these dwellings.

TABLE 17HOUSING - NATIVE POPULATION, FORT LIARD

| Hse.<br>No. | Construction & Size              | Occu-<br>pants | Occupation<br>Density | Approx.<br>Age | Power    | Condition         |
|-------------|----------------------------------|----------------|-----------------------|----------------|----------|-------------------|
| 1           | Log 18' x 18'                    | 3              | 72 sq/ft/per/p        | 8              | nil      | adequate          |
| 2           | Log/frame 28' x 12'              | 4              | 79                    | 9              | install. | "                 |
| 3           | Log 18' x 21'                    | 8              | 47.2                  | 9              | nil      | "                 |
| 4           | " 9' x 9'                        | 9              | 29                    | 6              | "        | <u>inadequate</u> |
| 5           | " 24' x 21'                      | 9              | 56                    | 4              | "        | adequate          |
| 6           | " 12' x 16'                      | 3              | 64                    | 2              | "        | "                 |
| 7           | Plywood 12' x 12'                | 1              | 144                   | 1              | "        | "                 |
| 8           | " (unocc.) 12' x 8'              | -              | -                     | 11             | "        | <u>inadequate</u> |
| 9           | Log 24' x 21'                    | 11             | 45.8                  | 5              | install. | <u>inadequate</u> |
| 10          | " 24' x 21'                      | 6              | 84                    | 5              | nil      | adequate          |
| 11          | " 24' x 21'                      | 10             | 50.4                  | 1              | "        | "                 |
| 12          | " 24' x 18'                      | 8              | 54                    | 3              | "        | "                 |
| 13          | " 28' x 24'                      | 1              | 432                   | 1              | "        | "                 |
| 14          | " 20' x 18'                      | 3              | 120                   | ?              | "        | "                 |
| 15          | " 18' x 18'                      | 5              | 64.8                  | 9              | "        | <u>inadequate</u> |
| 16          | " 15' x 15'                      | 4              | 56.2                  | 5              | install. | adequate          |
| 17          | Scrap 12' x 10'                  | 2              | 40                    | 6              | nil      | <u>inadequate</u> |
| 18          | Frame (old warehouse) unoccupied |                |                       | 10             | "        |                   |
| 19          | " 8' x 6'                        | 1              | 48                    | 20             | "        | <u>inadequate</u> |
| 20          | " 33' x 21'                      | 4              | 173.2                 | 25             | install. | adequate          |
| 21          | Log/frame 20' x 20'              | 8              | 50                    | 8              | "        | <u>inadequate</u> |
| 22          | Log 15' x 15'                    | 6              | 37.5                  | ?              | nil      | <u>inadequate</u> |
| 23          | Log/frame 27' x 27'              | 7              | 104.1                 | ?              | "        | adequate          |
| 24          | Log (old warehouse) unoccupied   |                |                       | ?              | "        |                   |
| 25          | " (old store) unoccupied         |                |                       | ?              | "        | <u>inadequate</u> |
| 26          | " 18' x 20'                      | 4              | 90                    | 5              | "        | adequate          |
| 27          | " 15' x 18'                      | 3              | 90                    | 11             | "        | "                 |
| 28          | " 27' x 24'                      | 9              | 72                    | 1              | "        | "                 |
| 29          | Log/frame 30' x 12'              | 2              | 180                   | ?              | "        | "                 |
| 30          | " 21' x 21'                      | 3              | 147                   | 7              | "        | "                 |
| 31          | " 15' x 12' unoccupied           |                |                       | ?              | "        | "                 |
| 32          | " 21' x 21'                      | 4              | 78.7                  | 3              | "        | "                 |
| 33          | " 15' x 15'                      | 10             | 22.5                  | ?              | "        | <u>inadequate</u> |
| 34          | " 21' x 21'                      | 11             | 40                    | 10             | "        | <u>inadequate</u> |

|    |       |           |            |      |    |     |                 |
|----|-------|-----------|------------|------|----|-----|-----------------|
| 35 | Log   | 27' x 24' | 7          | 92.6 | 3  | nil | adequate        |
| 36 | "     | 15' x 18' | unoccupied |      | ?  | "   |                 |
| 37 | "     | 15' x 15' | 7          | 32.1 | 8  | "   | adequate        |
| 38 | "     | 21' x 21' | 8          | 55   | 10 | "   | "               |
| 39 | Scrap | 9' x 10'  | 6          | 15   | 2  | "   | <u>inadequa</u> |
| 40 | Log   | 12' x 12' | 2          | 72   | 25 | "   | <u>inadequa</u> |
| 41 | "     | 12' x 12' | 6          | 24   | 26 | "   | <u>inadequa</u> |
| 42 | "     | 12' x 12' | 3          | 48   | 26 | "   | <u>inadequa</u> |
| 43 | "     | 15' x 12' | 1          | 180  | 9  | "   | <u>inadequa</u> |

NOTE: There are no clear and indisputable guides for determining inadequacy in housing, and it becomes especially difficult and controversial to attempt to do so in the north. However, the author uses "inadequacy" in the locally relevant sense and applies it to these houses judged substantially inferior to the average run of Native housing in the settlement. At the same time, however, the average run of housing itself can easily be judged quite inferior when compared to housing in the south.

The last eight houses listed in the table are located on the left bank of the Liard River opposite the Catholic Mission. The remainder are in the settlement proper. Of the total of 43 buildings listed, 35 are occupied by Indians and 2 by Metis. Sixteen of the 37 occupied buildings are classed as inadequate due to age, poor construction, overcrowding or other factors.

#### COMMUNITY HALL & BATH HOUSE

The community association of Fort Liard was incorporated under the Societies Ordinance of N.W.T. in January, 1964. As a result of this association of people in the community, and a system of Territorial grants available to such associations, a community hall was constructed to accommodate social gatherings of all kinds. In addition to the community hall, the members of the association undertook the construction and equipping of a community bath house. This was completed in 1968 and is a great credit to the community and to the acting Administrator who was the guiding influence.

#### COMMERCIAL ESTABLISHMENTS

The Hudson's Bay Co. is the only commercial concern in the settlement. An old store and a few associated buildings located near the Catholic mission are the remnants of a merchant/trader establishment which operated in the settlement for a time, but the business closed down some years ago.

The H. B. Co. has been established in Fort Liard since 1800 and the basis for its commercial activity is unchanged. The store purchases furs from the trappers and sells back general merchandise.

## LAND OCCUPANCY

A Dominion Land Survey was carried out at Fort Liard in July, 1955. The effect of that survey was to lay out a group of lots at the south end of the settlement and a second group at the north end.

Those in the south are grouped into "block A" with 8 lots, and "block B" with 15 lots. In the north, the lots are grouped into "block D" with 20 lots, and "block E" with a like number.

Indian and Metis ownership of land amounts to: Lot 1, block A; lots 2, 3, 4, 6, 7 and 8, block B; lots 6, 7, and 10, block D, and lots 9 and 10 block E. The balance of the lots occupied by Indians are Crown owned.

Lot 1, block B is owned by an absentee White and it is on this lot that the old store complex is situated.

The H. B. Co. was ceded the large land area at the core of the settlement under the Rupert's Land Act of 1868, and all Government installations, with the exception of the landing strip, are positioned on parcels leased from the H. B. Co. The Native-owned community hall and bath house are similarly leased. The balance of land is Crown property.

## NAHANNI BUTTE

### PHYSICAL ARRANGEMENT

All buildings in the settlement proper are situated along the bank of the South Nahanni River in more or less double echelon fashion. None is closer than approximately 100 ft. of the river bank. (plate 11)

The Government buildings are located at the westerly end, the Church and community hall just behind the teacherage, and the landing strip immediately to the rear of the settlement.

The establishment of the merchant-trader is located on the left bank of the river approximately one mile below the settlement. The Natives must use boats to reach it.

A Government floating-wharf is anchored to the shore directly in front of the school. As at Fort Liard, it is used for tying up small float-equipped aircraft and boats.

There is no "reefer" at Nahanni Butte for the preservation of meat, such as was placed in Fort Liard a few years ago.





Plate 11 - View of Nahanni Butte (settlement) looking to the west. The South Nahanni River is on the right hand of the photo. The north end of the Liard Range is just visible in the distance.

## ADMINISTRATIVE & GENERAL

### Administration

In the Nahanni Butte the school teacher also assumes the roll of administrator. His responsibilities are virtually identical to those discussed for Fort Liard; but, naturally, the demands upon his time are considerably fewer.

### Health

The local responsibility for health is, again, that of the school teacher who must act as lay dispenser to the community. A small supply of drugs and first-aid requirements are kept in the teacher's residence.

## AIRCRAFT LANDING FACILITIES

The small strip to the rear of the settlement is usually in poor condition and in the summer of 1968 was high with grass and tough weeds, and generally rough and deeply rutted. The strip receives no maintenance worth mentioning and is unusable during and following rains.

A second small strip was constructed by the merchant-trader to the rear of his establishment. This suffers similarly due to rains but generally is in a better state of repair than the strip servicing the settlement.



## ROADS

Only one road exists in the settlement and it connects the latter with the landing strip. It has a length of a few hundred feet and is roughly constructed. Due to the nature of the surface-soil and the lack of gravel, this road is thoroughly impassable during or following rains.

## POTABLE WATER

There are two shallow wells in the settlement. One of these services both the school and the teacherage, and the other, which is protected by a well-house, is for the use of the Indian dwellings.

Bacteriologically, the water is acceptable but it tends to be clouded, as if by extremely fine sediment, and has a slightly objectionable taste. Because of the taste, many Indians prefer to use the water of the South Nahanni River in spite of its inordinately high sediment load and doubtful purity.

## SEWAGE & GARBAGE

Human waste is disposed of in the ground by the use of outdoor privies. Only the school and teacherage are equipped with indoor plumbing and effluents are discharged into standard septic systems.

Garbage and general refuse are disposed of in two, quite deep pits located slightly to the rear of the settlement. They are cribbed with spruce logs to prevent caving and have a guard-rail to protect children against accidentally falling in.

## ELECTRICITY

The power generation facility consists of two diesel driven generators each with an output capacity of about 40 KW. The rate of power consumption requires at least one engine to be in continuous operation and the other alternates or is on stand-by. The equipment is tended by a Native power-plant operator. Major maintenance and repairs are carried out by N.C.P.C. at Fort Simpson who arrange for a mechanic to be sent by charter aircraft.

## EQUIPMENT

The only motorized equipment of Government ownership in the settlement is a domestic-type power lawnmower. This was being employed in the hopeless job of cutting weeds on the landing strip in the summer of 1968. An assortment of hand tools completes the inventory.

An absentee White, the owner of the large cabin in the foreground of plate 11, owns a very small Case caterpillar tractor and makes it available on a rental basis. It is useful only for very light work and the rent was understood to be excessive.

## EDUCATION

The one-classroom school is built from spruce logs obtained locally. It was constructed in 1959 but was not placed in operation until the arrival of the first teacher in 1961, immediately following completion of the teacherage. Summer school was held annually prior to its construction.

The building has a seating capacity for 25 pupils; a forced-air heating system; a water pressure system and a bath facility for the use of the children.

Table 18 is introduced to show enrollment over the past four years. Attendance was reputed to be better than it was at Fort Liard. Over the next five years approximately only eight children will be fed into the school system while, in the same period, thirteen will theoretically have left it. By 1973, barring immigration, enrollment is likely to be 10 pupils or less.

TABLE 18

### ENROLLMENT - NAHANNI BUTTE F.D.S.

| Year    | Enroll. | Grades |   |   |   |   |   |   |   | Teacher Days |
|---------|---------|--------|---|---|---|---|---|---|---|--------------|
|         |         | K      | 1 | 2 | 3 | 4 | 5 | 6 | 7 |              |
| 1964/65 | 21      | 3      | 3 | 4 | 7 | 3 | - | - | - | 197          |
| 1965/66 | 23      | 4      | 2 | 5 | 2 | 6 | 3 | - | 1 | 197          |
| 1966/67 | 20      | 1      | 3 | 3 | 4 | 1 | 6 | 1 | 1 | 199          |
| 1967/68 | 15      | -      | 2 | 3 | 2 | 3 | 1 | 4 | - | 199          |

Data Source: Federal Day School records, Nahanni Butte

## NATIVE HOUSING

The Native dwellings, and for that matter all other buildings in the settlement, are of log construction. They measure 21' x 31' and were built between 1959 and 1961. The Government assisted in their construction by supplying all flat wood, window frames and doors, etc. In addition, rations were supplied to the Indians while construction was in progress.

The external condition of the buildings is excellent and none could be classed as inadequate from that particular standpoint. Many of the interiors, however, are badly in need of upgrading. All dwellings are connected to the electrical distribution system. Wood-burning stoves are used for heating and cooking.

Occupation density, and dwelling number according to the settlement plan. (appendix 4), appear in the table on the following page.

TABLE 18AOCCUPATION DENSITY IN NATIVE HOUSING

| House No.                       | 2   | 3    | 4     | 5    | 6    | 7   | 8     | 9     | 10  | Gov.<br>11 |
|---------------------------------|-----|------|-------|------|------|-----|-------|-------|-----|------------|
| Occupants                       | 2   | 9    | 6     | 15   | 10   | 5   | 4     | 4     | 1   | 2          |
| Occ. Density<br>(sq. ft. per/p) | 325 | 72.3 | 108.5 | 43.4 | 65.1 | 130 | 162.7 | 162.7 | 651 | 110        |

NOTE: Building No. 11 is an old Government warehouse being used by a Native couple pending construction of a house.

COMMUNITY HALL

A large community hall with a hexagonal configuration serves as a gathering place for social events and the showing of movie films. The school teacher is usually the guiding and initiating force behind most social activity and also assumes the responsibility for ordering movies from the outside suppliers.

COMMERCIAL ESTABLISHMENTS

The sole commercial enterprise in the community is a fur-trading post and store operated by Mr. A.G. Turner, one of the White settler families mentioned under the chapter on the population.

The business commenced about 1954 following the death of a previous entrepreneur who operated a store in the vicinity of Nahanni Butte. Mr. Turner also conducted a small barging service on the Liard River and for many years serviced parties of the Geological Survey of Canada and petroleum companies engaged in mapping and exploration. The service was discontinued in 1966.

Mr. Turner informed the author that by the end of 1968 he would likely give serious consideration to closing the store and perhaps move from the area altogether. He would like to see the Natives encouraged to form a cooperative store in the settlement and made a rather generous offer to dispose of his own stock at cost to such a cooperative. He would transfer the store building, with warehouse attached, for a token sum only. This could be readily moved by tractor during the winter. A discussion on the store and trading activity is contained in the chapter on the economy.

LAND OCCUPANCY

A legal land survey was carried out in the settlement in July 1962 resulting in the designation of nine lots, a road allowance and a Government reserve along the river bank.



With the exception of two houses on lot 3, all Indian dwellings are situated on lot 1. None of the Indian residents of Nahanni Butte has purchased his own land, but, mainly lot 1 has been set aside for their occupancy.

An absentee White has title to a surveyed parcel at the extreme east end of the settlement and has constructed a log house on it. A parcel on lot 9 is held under a five-year lease by the Northern Evangelical Mission. Similar leases of five acres are held by the merchant-trader discussed earlier and by the family located at "Hot Springs" about fifty miles above Nahanni Butte on the South Nahanni River.

## TROUT LAKE

### PHYSICAL ARRANGEMENT

The lay-out of buildings at Trout Lake is random. A pair of Government structures is located at the extreme south-end of the settlement and the remaining buildings are spread out to the north as far as Island River. There is a small ballasted jetty on the lake shore in front of the Government buildings but, due to its height above the water, it is useless as a tie-up for float aircraft.

A small landing strip is located to the rear of the settlement, but, as with many of these small landing strips, it serves better as a fire-break, which is the other purpose these strips were intended to fulfill.

There are no roads of any description in the settlement, nor is there any vehicular equipment of any sort. People move about over foot trails which form a network connecting all dwellings, including the Government structures. (plate 12)

### GENERAL

The Government receives token administrative representation through the headman in the settlement. This individual generally supervises and participates in all public works programs mounted at Trout Lake by the Fort Simpson authority.

The education authorities have not seen fit to establish a school in the settlement and there can be no doubt that there is ample justification for choosing this course.

There is no electrical generating facility in the settlement and lighting is achieved through the use of pressure lanterns using fuel obtained periodically from either of Forts Simpson or Liard.

### POTABLE WATER

Water is obtained from either a shallow well located near the south end of the settlement, or from the lake itself.





Plate 12 - View of Trout Lake settlement looking to the southeast. The mouth of Island River appears in the lower left corner, and the diagonal clearing to the rear of the settlement is the landing strip.

### NATIVE HOUSING

Several of the Indian dwellings in the settlement appear to have been constructed with Government assistance as to the supply of flat materials. For the most part, the houses appear, in the circumstances, to be adequate. As in all the permanent settlements, with the exception of Fort Simpson where a large number of the Native dwellings use fuel oil, heating and cooking are achieved by the use of wood-burning stoves of assorted designs.

Table 19 is introduced to show the approximate size and occupation density of the several dwellings. No reliable information could be obtained as to the age of the dwellings, but none appeared to be more than twenty years old and some were of very recent construction. Two houses located at the north end of the lake are included in the table but information relating to their dimensions, age and general condition was not available.

TABLE 19HOUSING - NATIVE POPULATION, TROUT LAKE

| Hse.<br>No. | Construction & Size |           | Occupants | Occupation<br>Density | Condition         |
|-------------|---------------------|-----------|-----------|-----------------------|-------------------|
| 1           | Log                 | 14' x 16' | 5         | 44.8                  | adequate          |
| 2           | "                   | 14' x 16' | 5         | 44.8                  | "                 |
| 3           | "                   | 18' x 15' | 2         | 135                   | <u>inadequate</u> |
| 4           | "                   | 14' x 26' | 5         | 72.8                  | adequate          |
| 5           | "                   | 14' x 38' | 5         | 106.8                 | "                 |
| 6           | "                   | 14' x 16' | 4         | 56                    | "                 |
| 7           | "                   | 14' x 16' | 5         | 44.8                  | "                 |
| 8           | "                   | 14' x 38' | 10        | 53.4                  | "                 |

-----

HOUSING AT NORTH END OF LAKE

Two log houses (not shown on settlement plan)

OTHER BUILDINGS

|    |     |           |                            |        |     |
|----|-----|-----------|----------------------------|--------|-----|
| 9  | Log | 20' x 20' | Warehouse                  | (Gov.) | new |
| 10 | "   | 18' x 21' | Cabin                      | (Gov.) | "   |
| 11 | "   | 8' x 8'   | Well-house                 |        | "   |
| 12 | "   | 14' x 14' | Catholic Church & quarters |        | "   |

LAND OCCUPANCY

A legal survey has not been conducted in the settlement, nor has an official site plan been prepared. All land in the vicinity is crown owned, including that on which the Indian dwellings rest.

About five miles north of Trout Lake settlement, near the lake shore, is a sports fishing camp owned by A.G. Turner, the merchant-trader at Nahanni Butte. The camp is located on a five-acre parcel leased from the Government

JEAN MARIEPHYSICAL ARRANGEMENT

The Government buildings are located toward the westerly end of the settlement and the Indian dwellings form a rough crescent to the east near the banks of the Mackenzie River. A portable saw-mill and a community garden are situated directly at the junction of the Mackenzie and Jean Marie Rivers.

A landing-strip is located immediately to the rear of the settlement. A small wharf is secured to the shore of a channel between the mainland and a small island at the junction of the two rivers. The settlement is fairly compact and occupies a comparatively small ground area (plate 13). The airstrip is extremely short and rarely used.



Plate 13 - View of Jean Marie looking easterly. The saw-mill is situated on the right bank of the Jean Marie River in the foreground. The left bank of the Mackenzie River is just visible in the upper left corner. The cultivated patch near the saw-mill is put-down in potatoes.

ADMINISTRATIVE & GENERAL

The resident school teacher assumes the role of administrator in the settlement and is responsible for the tasks set-out under Fort Liard. The teacher also serves as lay-dispenser to the community, but the settlement is easily accessible to medical help from Fort Simpson.



## AIRCRAFT LANDING FACILITIES

The landing strip is about the shortest in length to be found anywhere in the region. Its useable surface measures no more than 1200' and terminates in the east on the banks of the Mackenzie River. Its west end terminates at an old channel of the Jean Marie River course which drops abruptly to a level about fifteen feet below the runway surface. The strip is useful as a fire-break but for little else.

## ROADS

There is a small net-work of trails which double as roads in Jean Marie. These become roads merely through continued use and not through construction or maintenance.

## POTABLE WATER

The school, which is combined with living quarters, has water on pressure and obtains it from a shallow cribbed-well. One Indian household has a well also. Water from it is used by some of the other households, and many still draw water from the rivers.

## SEWAGE & GARBAGE

With the exception of the school and teacherage which employ a septic system, the dwellings are serviced by privies. Garbage is disposed of in a pit.

## ELECTRICITY

The power-house is equipped with two diesel-driven generators each with an output capacity of 15 KW. All buildings are hooked to a pole-suspended distribution system. The responsibility for the operation of the power system rests with a Native power-plant operator employed by D.I.A.N.D. The individual is also the school janitor and the headman of the settlement.

## EQUIPMENT

A D6 Caterpillar tractor has been on loan to the settlement from D.I.A.N.D. for several years. The principal uses of this equipment are for the hauling of saw logs from the bush and the supplying of motive power to operate the mill. The latter is accomplished by a power take-off. The sawyer is responsible for running maintenance on the tractor, but the D.I.A.N.D. carries out major maintenance tasks and undertakes to provide replacement parts. In addition to the mobile equipment described above there is a native-owned, late model pick-up truck in the settlement.



## EDUCATION

The present federal day school is of log construction and combines a large apartment for the teacher. The one large classroom has a seating capacity for approximately 50 pupils and is, at the present time, greatly under-utilized. Enrollment over the past eight years was as follows:

TABLE 20  
ENROLLMENT - JEAN MARIE F.D.S.

| Year    | Enroll. | K       | 1 | 2 | 3 | 4 | 5 | 6 | 7 | Teach.<br>Days | Attendance<br>Possible | Actual |
|---------|---------|---------|---|---|---|---|---|---|---|----------------|------------------------|--------|
| 1960/61 | 18      | 1       | - | 3 | 4 | 1 | 4 | 3 | 2 | 202            | 3636                   | 2929   |
| 1961/62 | 16      | 1       | 1 | - | 5 | 3 | - | 6 | - | 197            | 3152                   | 2523   |
| 1962/63 |         | no data |   |   |   |   |   |   |   |                |                        |        |
| 1963/64 | 16      | 3       | 2 | - | - | 4 | 2 | 5 | - | 174            | 2784                   | 2202   |
| 1964/65 | 16      | 1       | 4 | 2 | - | 1 | 5 | 3 | - | 196            | 3136                   | 2553   |
| 1965/66 | 13      | -       | 4 | 3 | 2 | - | 3 | 1 | - | 121            | 1573                   | 1498   |
| 1966/67 |         | no data |   |   |   |   |   |   |   |                |                        |        |
| 1967/68 | 10      | -       | 2 | 3 | 1 | 2 | 1 | 1 | - | 194            | 1940                   | 1878   |

Data Source: Federal Day School records, Jean Marie

On the basis of the prevailing population structure and recent school enrollment, the number of children entering school should just about offset the number leaving it over the coming five-year period. The drop-out rate, however, could very well upset the balance to produce a lower enrollment in 1973 than at present.

In addition to the attendance at the local school discussed above, eleven children of the Jean Marie settlement were attending the higher grade school at Fort Simpson and living at the hostel.

## HOUSING

The Native housing in the settlement is of log construction, but differs from log housing described for previous settlements in that logs are squared on three sides. This makes for a much sturdier building and reduces substantially the amount of chinking required to keep out drafts. Heating and cooking are by wood-burning stoves.

All housing was in good condition but the principal complaint of the occupants was the lack of space. The author can certainly vouch that the lack of adequate dimensions is common to most Indian housing and a large proportion of the dwellings could be classed as "inadequate" on the strength of crowding alone.

A table showing building dimensions, construction and density of occupation follows. A useful determination of building age could not be obtained but most would appear to be less than twelve years old.

TABLE 21

HOUSING - NATIVE POPULATION, JEAN MARIE

| Hse.<br>No. | Construction & Size |           | Occupants                      | Occupation<br>Density | Electric<br>Power | Condition         |
|-------------|---------------------|-----------|--------------------------------|-----------------------|-------------------|-------------------|
| 1           | Log                 | 21' x 21' | (unoccupied)                   |                       | installed         | good              |
| 2           | "                   | 21' x 21' | 16                             | 33                    | "                 | <u>inadequate</u> |
| 3           | "                   | 21' x 25' | 7                              | 75                    | "                 | adequate          |
| 4           | "                   | 21' x 25' | 8                              | 65                    | "                 | "                 |
| 5           | "                   | 21' x 25' | 8                              | 65                    | "                 | "                 |
| 6           | "                   | 21' x 16' | 4                              | 84                    | "                 | "                 |
| 7           | "                   | 21' x 21' | (unoccupied at time of survey) |                       | "                 | good              |
| 8           | "                   | 21' x 21' | 7                              | 63                    | "                 | adequate          |

NOTE: Other buildings, owned by other than Natives, are identified on the settlement plan appendix 6.

COMMUNITY ASSOCIATION

A community association has been formed and an application for financial assistance in the construction of a curling-rink was approved by the Community Centre Capital Construction Program, N.W.T., in February 1968. It was expected that a start would be made on construction in late 1968.

COMMERCIAL ESTABLISHMENTS

The saw-mill operation at Jean Marie has been going for several years and received a good deal of fostering from D.I.A.N.D. in earlier years. The first portable mill was placed in the settlement by D.I.A.N.D. about 1957; which Department subsequently delivered the D6 caterpillar tractor in support of the mill.

The mill functions as a cooperative but does not appear to have any formal legal basis, and proper books of account, if they exist at all, could not be produced. Apart from these oversights, the enterprise functions extremely well; due in no small part to the clanishness of the families and the recognition of a more or less natural leadership in the community.

The old mill broke-down in 1968 and was set aside at the time of the survey visit in the summer. Due to some disagreement with the regional authorities over replacement parts, and the inability of local forest-stands to support a continuing lumbering operation, the community decided to purchase a new mill with its own funds and had it operating in August.

### LAND OCCUPANCY

A legal land survey has been conducted in the settlement and lots were set aside for Indian housing. None of the residents has so far seen fit to purchase land, so ownership remains vested in the Crown. Lots 1, 2 and 3 of the survey appear reserved by the D.I.A.N.D. for Indian housing and other purposes.

### FORT SIMPSON

#### PHYSICAL ARRANGEMENT

The lay-out of buildings and facilities at Fort Simpson closely approaches that to be found in small villages in the south. Evidence of this is perfectly clear in the settlement plan, appendix 7, and further explanation is unnecessary. The largest building to be added to the Government complex in recent times was the administrative or Federal building. One end of it houses the post-office.

The island location of Fort Simpson depends upon an earth causeway for its road connection with the mainland. The Spring of 1968 was one of the few occasions when Spring floods did not breach the causeway and isolate the settlement until repairs could be effected. (Plate 14)



Plate 14 - View of the causeway connecting the island with the mainland. The airport road may be seen immediately below the aircraft.



## ADMINISTRATIVE & GENERAL

### Administration

It was mentioned before that Fort Simpson is the administrative seat for an area rather larger than the Lower Liard Region. The Area Administrator is supported by an assistant, clerks and a small maintenance staff.

A local advisory council, about which more will later be said, advises the administrator on certain matters pertaining to the improvement of Fort Simpson.

The outlying permanent population centres are in fairly regular communication with Fort Simpson by radio and are visited periodically by the Area Administrator who charts a local aircraft for the purpose.

### Law Enforcement

The R.C.M.P. established a detachment in Fort Simpson in 1913. At the present time, the detachment is made up of two men with families and several buildings are located in a compound near the bank of the Mackenzie River.

One of the residences contains an office and detention cells. In the summer of 1968 a new warehouse was under construction and this was intended to contain new detention space, as well as added storage facilities.

A court of Summary Conviction may be convened in Fort Simpson as required. It is presided over by a Justice of the Peace in the person of the Anglican Minister. The number of charges laid in the Fort Simpson area of police jurisdiction are proportionately higher than in the Fort Liard area, for reasons which should be clear. However, the number of charges laid are not considered to be greater in number than one might expect in the south. Perhaps the most significant difference is the general absence of serious crimes which are encountered in larger numbers in the south. In Fort Simpson, as is common elsewhere in the north, charges are usually associated in some way with alcohol. A summary of these is given in the table that follows:

TABLE 22

| Year       | Number of Charges |
|------------|-------------------|
| 1966       | 201               |
| 1967       | 156               |
| 1968 (1/2) | 85                |

Data Source: R.C.M.P., Fort Simpson



## Health

There are two institutions in the settlement concerned with health matters, these are: the D.N.H.W. with its nursing station, usually staffed by two nurses and a doctor; and St. Margaret's Hospital which was established in the settlement in 1916. According to Sacred Heart Mission (1958: p. 41) the hospital was destroyed by fire in June, 1930, and was rebuilt and opened in October of the following year. (plate 15)



Plate 15 - St. Margaret's Hospital, Fort Simpson. The building in the foreground is the residence of the Oblate Fathers.

In the 1950's the hospital had 60 beds, but in later years this was reduced to approximately 25 beds as a result of the building's age and its lack of a modern sprinkler system for fire protection. The hospital is operated by the Grey Nuns and the total staff in 1968 was approximately thirteen persons.

A report by Makale, Holloway & Associates (1966) contained recommendation for a new 18 - 20 bed hospital in the settlement, but it is not known what steps, if any, will ultimately result from it.

The largest number of deaths in any one year appear to have occurred in 1928 when some thirty persons died from an epidemic of influenza. Other than this, deaths do not seem to have been unusually high.

## AIRCRAFT LANDING FACILITIES

The D.O.T. strip was mentioned under communication systems and it is, by far, the busiest in the Lower Liard Region. A second smaller landing-strip is located on the island and is used by private charter carriers using generally smaller aircraft. Like most strips in the region, it is poorly maintained and is generally unuseable during and following rains. There are no landing aids of any kind at the island strip.

## ROADS

Fort Simpson and vicinity has approximately 20 miles of maintained roads. The single longest stretch is between the south end of the causeway and the D.O.T. airport, located some twelve miles south of the settlement. The settlement roads are not gravel-surfaced and must be oiled in the summer to suppress dust. The road to the airport is gravelled in only a few spots. The rest of this road is a silty-sand and is dust ridden.

## UTILITIES

Fort Simpson is the only settlement in the Lower Liard Region which has an official organization for the express purpose of providing a range of utilities on a charge basis.

The Northern Canada Power Commission in Fort Simpson is a large establishment by comparison with any other official organization in the region. Besides being responsible for the provision of electricity, water and sewage disposal, it engages in numerous other activities. Some of these are mentioned near the conclusion of this chapter.

### Potable Water

Water is drawn directly from the Liard side of the Mackenzie/Liard confluence and passes into a pre-settling tank of 5000 gallon capacity. The water then passes through a filtration plant where it finally receives chemical additives. A circulating system then passes it to the mains and keeps it in continuous motion to inhibit freezing.

A dual take-off is required for each consumer and a circulating pump must be installed on one side of the line to conform to the continuous flow requirements of buried systems in the permafrost zone or its fringe.

The distribution system is buried to a depth of eight feet, and at the time of the survey, was being extended to include the numerous Indian dwellings at the north end of the settlement. Water, at the time, was being delivered to Indian houses by a tanker truck.

Sewage

Raw sewage passes directly into the Mackenzie River via a gravity collection system. It is planned to bring the Indian dwellings clustered at the north end of the settlement into the system in 1969.

The large volume of swiftly moving water in the Mackenzie River appears to serve as justification for the disposal of untreated pollutants. Past experience has shown, however, that it is rarely too early to establish maximum permissible levels for the kinds and quantities of pollutants that a particular drainage system can safely dispel. This holds just as true for a system as immense as the Mackenzie as it does for lesser systems and should, therefore, be an important consideration in any future planning.

Garbage

Garbage is handled on a regular collection basis under local contract and is disposed of in a dumping area set aside at the north end of the island.

Electricity

The output capacity of the Fort Simpson generating station is approximately 1200 KW. The line voltage is 2300 VAC, with appropriate reduction through line transformers. The distribution system is pole suspended.

EQUIPMENT

The vehicular equipment inventory in the settlement is comparatively large. The following summary separates Government-owned from privately-owned vehicular and earth-moving equipment and must be considered approximate only.

TABLE 23VEHICLES - FORT SIMPSON

| Type                            | Government | Private |
|---------------------------------|------------|---------|
| Passenger Cars                  | 2          | 31      |
| Trucks (various Makes & Models) | 22         | 20      |
| Trailers (various types)        | 3          | 4       |
| Stn. Wagons                     | 3          | 7       |
| Motorcycles                     | -          | 5       |
| Bombadiers                      | 3          | -       |
| Crawler Tractors                | 1          | 1       |
| Wheeled Tractors                | 8          | -       |
| Graders                         | 1          | 2       |
| Loaders                         | -          | 1       |
| Winches                         | -          | 1       |
| Excavators                      | 1          | -       |

Data Source: D.I.A.N.D. Fort Smith



## EDUCATION

The first day school was opened at Fort Simpson in 1881 by the Anglican Mission; although, some Fort Simpson children had been exposed to education at the Catholic residential school established at Fort Providence in 1867. In 1917 the Catholic Mission established its day school at Fort Simpson. These two day schools operated more or less continuously until 1949 when a small non-denominational school was opened by the Government.

The Anglican Mission favoured the non-denominational school, but the Catholic Mission objected to it and continued to operate independently until about 1958 when the new school gained the ascendancy. Today, all children attend the same school, regardless of religious following, but each denomination is afforded one half-hour per day of religious teaching.

Associated with the Thomas Simpson federal day school is a large hostel complex mentioned in the introduction to this chapter. The hostel consists of two buildings one of which is referred to as the Catholic hostel and the other the Anglican hostel. These are for the accommodation of children from the outlying settlements attending the school for teaching in grades seven through nine. Enrollment data for the school and the hostels are shown in tables 24 & 25.

The school provides training in certain of the industrial arts such as photography, and leather, lapidary, wood and metal work. An introductory course to the foregoing is given to all students in grades seven through nine, and to occupational students in the middle grades. A limited amount of vocational training is also provided in cooperation with the Government agencies in the settlement. Some of the latter training has included trapping, steam and water plant operation, and the operation and maintenance of vehicular equipment.

There can be little doubt that schooling in the large centres is far superior to that in the smaller more isolated settlements, and, moreover, that grade six would appear to be the optimum cut-off grade for these comparatively isolated schools. The prospect of extending the outlying schools to grade eight in the near future found little favour with the teaching profession who feel that the already high drop-out rate is bound to accelerate as a result.

TABLE 24

### ENROLLMENT AT THOMAS SIMPSON F.D.S.

| Year    | Seating<br>Cap. | Total<br>Enrol. | Grades |    |    |    |    |    |    |    |    |    |    |    | Teach. Attendanc |          |
|---------|-----------------|-----------------|--------|----|----|----|----|----|----|----|----|----|----|----|------------------|----------|
|         |                 |                 | K      | 1  | 2  | 3  | 4  | 5  | 6  | 7  | 8  | 9  | 10 | 11 | Days             | (Percent |
| 1962/63 | 340             | 302             | -      | 62 | 42 | 42 | 34 | 36 | 33 | 20 | 15 | 11 | 7  | -  | 14               | 92.5     |
| 1963/64 | 350             | 281             | 9      | 29 | 30 | 40 | 39 | 25 | 28 | 41 | 10 | 16 | 8  | 6  | 19               | ?        |
| 1964/65 | 350             | 290             | 14     | 30 | 33 | 40 | 40 | 27 | 27 | 41 | 10 | 15 | 7  | 6  | 19               | 93.2     |
| 1965/66 | 325             | 337             | -      | 82 | 42 | 46 | 36 | 44 | 32 | 25 | 17 | 13 | -  | -  | 18               | 95.3     |
| 1966/67 | 325             | 316             | -      | 69 | 47 | 28 | 53 | 24 | 34 | 34 | 18 | 9  | -  | -  | 18               | 91.5     |
| 1967/68 | 325             | 358             | 35     | 62 | 47 | 39 | 28 | 48 | 29 | 32 | 27 | 11 | -  | -  | 20               | 94.9     |



FIVE-YEAR FORECAST OF ENROLLMENT

|         |     |    |    |    |    |    |    |    |    |    |    |    |
|---------|-----|----|----|----|----|----|----|----|----|----|----|----|
| 1968/69 | 410 | 23 | 15 | 61 | 55 | 48 | 40 | 40 | 50 | 36 | 30 | 12 |
| 1969/70 | 425 | 25 | 15 | 60 | 57 | 52 | 48 | 45 | 45 | 45 | 36 | 14 |
| 1970/71 | 437 | 26 | 15 | 60 | 58 | 53 | 52 | 50 | 50 | 42 | 45 | 16 |
| 1971/72 | 453 | 30 | 15 | 60 | 60 | 55 | 53 | 51 | 51 | 47 | 42 | 15 |
| 1972/73 | 469 | 31 | 15 | 64 | 60 | 55 | 55 | 53 | 53 | 48 | 47 | 18 |

---

Data Source: Principal, Thomas Simpson, F.D.S., Fort Simpson

Additional data not evident in the enrollment table are summarized below:

|  |     |
|--|-----|
| Average Catholic enrollment for the period | 280 |
| Average Anglican enrollment for the period | 87  |

Enrollment by ethnic origin

|  |     |
|--|-----|
| Average Eskimo enrollment for the period                 | 22  |
| Average Indian enrollment for the period                 | 195 |
| Average Other (White/Metis) enrollment for<br>the period | 96  |

TABLE 25

ENROLLMENT AT HOSTEL COMPLEX FOR YEAR 1967/68

| <u>Total Enrollment</u> | <u>Settlement of Origin</u> | <u>Children</u> |
|-------------------------|-----------------------------|-----------------|
| 205                     | Fort Simpson                | 53              |
|                         | Fort Liard                  | 26              |
|                         | Fort Providence             | 2               |
|                         | Fort Rae                    | 36              |
|                         | Fort Wrigley                | 9               |
|                         | Jean Marie                  | 11              |
|                         | Conwoyto Lake               | 4               |
|                         | Bay Comeau Harbour          | 22              |
|                         | Coppermine                  | 2               |
|                         | Hay River                   | 13              |
|                         | Yellowknife                 | 13              |
|                         | Fort Smith                  | 12              |
|                         | Two Islands                 | 2               |

---

Data Source: Catholic and Anglican Hostels, Fort Simpson

From these tables it can be seen that Fort Simpson children accounted for over 25% of the hostel enrollment and over 57% of the school enrollment. A few Nahanni Butte children were enrolled at the hostels but the exact number could not be determined.

### THE CHURCH

The Anglican and Catholic Churches, next to the H.B. Co., are the oldest established institutions in the community, and the region as well, and ante-date the presence of Government establishments by about one half-century.

Both religions were active in schooling at a very early date and continue their involvement through the hostel complex discussed earlier. A survey carried out by the Catholic Mission in January 1968 asserts that about 80% of the Native population are Catholic and most of the balance is Anglican. The Episcopal Mission has a small membership in the community.

The Catholic establishment is by far the largest in terms of activities, land ownership and buildings. One of its major accomplishments is St. Margaret's Hospital which it built, and operates, with Government assistance. In bygone years, much of the food consumed by members of the Church and the hospital patients consisted of hardy vegetables grown by the Oblate Fathers of the mission. This is still done at the present time but on a much reduced scale.

### NATIVE HOUSING

Housing surveys have been both numerous and detailed in the settlement of Fort Simpson and the author feels that little would be gained by contributing to their redundancy. The recent housing surveys have been about equally detailed and altogether comprehensive. The first of the recent ones was carried out by Makale, Holloway & Associates in 1966 in conjunction with a development plan for the settlement, in 1967 a further housing survey was conducted by the Northern Housing Section, D.I.A.N.D., and, in the summer of 1968, the Regional Administrator commissioned still another housing survey.

Since the Makale survey, ten houses built of flat-stock materials were erected for Indian occupancy, and 1968 was to see the first eight of the low-rental units under the northern five-year housing program erected in the settlement.

A summary contained in the report resulting from the Northern Housing Section survey in 1967 concluded that, of the 114 houses examined, 23 were considered as unacceptable, presumably due to age, poor construction and the like, and an additional 13 houses were overcrowded.

Most Indian houses in the settlement are serviced with electricity and, as was noted elsewhere, by 1970 all in the settlement are expected to be connected to the water and sewage systems.

## COMMUNITY HALL & RECREATIONAL FACILITIES

Fort Simpson has a large community building located next to the Federal Building, both of which may be seen on the settlement plan appendix 7. The building is used for social activities consisting mainly of dances. A large collapsible swimming tank is installed in the building for the use of children and adults.

A large enclosed arena owned by the Catholic Mission is located opposite the new N.C.P.C. warehouse. This is leased to the community club for hockey activities during the winter months.

A baseball diamond is located opposite the N.H.W.D. nursing station and it received a good deal of use by mixed teams of younger people throughout the summer. The school has a large well-equipped gymnasium and outdoor sports are also held in the school grounds.

## SPECIAL AGENCIES

### Department of Agriculture, Experimental Farm

The farm was established at Fort Simpson about twenty years ago to undertake research in the cultivation of various crops under sub-arctic conditions. The farm has transferred much of its activity to the Department's Research organization at Beaverlodge, but continues to accumulate data on specific crops begun prior to the transfer.

The experimental data should have valuable application in the Lower Liard Region and along the Mackenzie in the future, when it is reasonable to expect that some of the arable land will be devoted to agricultural pursuits on a significant economic scale.

### Northern Canada Power Commission

This Crown agency was mentioned in the introduction to this chapter and later in connection with utilities at Fort Simpson. Apart from the utilities interests of N.C.P.C., the commission also engages in maintenance work for D.P.W., and for some private accounts as well. It has on its staff the only plumbers in the settlement and these carry-out installations in Government and private accommodations alike, in the name of N.C.P.C. It also handles electrical repairs to appliances of all kinds. Excavation work for the laying of the water and sewer extensions to the Indian housing area in 1968 was conducted using N.C.P.C./D.I.A.N.D. equipment and N.C.P.C. employees.

## COMMERCIAL ESTABLISHMENTS

In this section the report introduces the private commercial concerns established at Fort Simpson. The report will concern itself in this chapter only with out-



lining the background of these establishments. Their contributions to the local economy will be discussed in the chapter on the economy.

Simpson Construction Ltd. - The company began as a proprietorship about 1952 to engage in general cartage. By 1958 the company had entered the general contracting field in the settlement and in 1963 became a private limited company under the laws of Alberta. An inventory of equipment is given in appendix 8.

In 1959 a partnership was formed with Goeson Lumber of Fort Simpson to produce saleable lumber using a portable mill. The partnership was dissolved the same year and Simpson Construction took over the operation of the mill which has produced lumber intermittently up to and including 1968.

Between the years 1959 and 1963 the company established a barging service between Forts Simpson and Providence. The service was subsequently sold to Lindberg Transport, mentioned later in this section.

Simpson Construction Ltd. is virtually wholly dependent upon Government contracts to sustain the general contracting side of its business. Much of this consists of road maintenance work in and about the settlement.

Lindberg Transport Ltd. - This company was incorporated under the laws of Alberta in 1967, but began as a proprietorship at the time of its purchase of barging equipment in 1961. The equipment and operating schedule of the company were discussed in the chapter on communication systems and nothing more needs to be added at this time.

J.R. Cree Bulk Oil Sales Ltd. - The company began as a proprietorship in 1963 and became a private limited company in 1966. The function of the company is that of commission agent for Imperial Oil Ltd. of Edmonton. With the exception of the bunker-fuel used by N.C.P.C., and which N.C.P.C. purchases direct from Imperial Oil, all petroleum products in the settlement are handled by the J.R. Cree company using Imperial Oil Co. storage facilities, both in the settlement and at the D.O.T. airport.

Mark's Northern Service Ltd. - The company operates a vehicle service-centre and a light haulage business. It is, in addition, passenger and freight agent for Western Pacific Airlines. The service station was acquired by the present owner in 1963 and the additional services have been added since the year of acquisition.

Construction of an addition to the service building was in progress in 1968 to prepare for increased activity expected in the area of heavy equipment servicing resulting from current highway construction and nearby exploration activity.



Arctic Air Ltd. - The company operates an air charter service out of Fort Simpson as its designated base. Arctic Air acquired the bulk of its physical assets from Northern Mountain Airlines Ltd. of Prince George, B.C. which operated a charter business in the settlement for several years.

Arctic Air was incorporated under the laws of British Columbia early in 1968 and has obtained financing from the Industrial Development Bank for the purpose of expanding its fleet and ground facilities. Its present aircraft and rate schedule were discussed in the chapter on communication systems.

Hudson's Bay Co. - This company requires little introduction and is included mainly to complete the listing of commercial establishments. It commenced operations in 1821 following amalgamation with the Northwest Company and has operated continuously ever since. Although the company is more often criticized than not, it has always been a very important contributor to continued habitation and growth in the region.

R.J. Jones Store - R.J. Jones is a free-trader who originally established a store in 1964 as a partnership. The partnership was dissolved in the same year and the business has been carried on by Jones ever since.

The store's operation is similar to the H.B. Co., it purchases furs and sells merchandise. The Jones store, however, appears to stock mainly food stuffs whereas the H.B. Co. stocks a large variety of merchandise.

Fort Simpson Hotel - The Fort Simpson Hotel was established over forty years ago, with some modifications being made to the original structure since that time. The business changed hands in the early 1950's and again in 1962 when the present owner purchased it. (plate 16)

Guest overflow from the main building is accommodated in a duplex on the hotel property to the rear of the main building. By this method, accommodation for about forty persons is possible.

Full course meals are available in a dining area in the main building. The dining room generally closes about 7:00 o'clock in the evening, but meals are available after that time by prior arrangement.

Territorial Liquor Commission store - The Commission acts as a commercial establishment by reason of its stores operated specifically for the retailing of alcoholic beverages in the N.W.T.

The outlet is contained in space rented from a resident of Fort Simpson and was opened for the sale of beer on February 10, 1968 following a successful plebiscite in the previous year. On August 3, 1968 the outlet added liquor and wine to its stock of merchandise.

The store hours during the summer of 1968 were restricted to one hour on Tuesdays and Fridays, and two hours on Saturdays. It is probable that these hours will have to be expanded in the future to cater to tourists and other travellers expected in the settlement following completion of the highway



Plate 16 - Fort Simpson Hotel

### LAND OCCUPANCY

Land occupancy on the island of Fort Simpson has been something of a problem for as long as records have been kept, and promises to become more enlivened in the presence of an increasing population and a concomitant need for additional land for new housing. The total area of the island is approximately 780 acres. During the flood of 1963, all but 185 acres were inundated. Virtually, all buildings in the settlement are contained within this latter area which is delimited by the 1963 flood-line depicted in appendix 7.

The Government, with its several building complexes, including the experimental farm, is now the single largest occupier of land in the settlement. The experimental farm, along with the Catholic Church, together possess the largest blocks of vacant land suitable for housing purposes. The Anglican Church has a part of lot 6, fronting on the Mackenzie River, which is largely vacant. The Government has been negotiating for its purchase, presumably for housing.

According to the 1967 tax roll there are 158 assessed properties on the island. Their distribution was as follows: 120 properties are assessed to private individuals, 38 of whom were Indian; 26 were assessed to institutions, mainly religious; 8 to commercial establishments and 2 to a Crown Corp. (N.C.P.C.) The two remaining properties could not be accounted for.

## TUNGSTEN

### PHYSICAL ARRANGEMENT

A plan of the Tungsten town-site was not available but the survey was able to construct one from a number of oblique photographs taken through a window in the aircraft.

The plan, appendix 9, should not be used for direct measurements as the scale is unreliable for that purpose. The arrangement of the settlement is evident in the plan and need not be expanded in the text. (Plate 17)



Plate 17 - Oblique view of Tungsten. The surrounding mountains rise above 8000 feet in places.

### ADMINISTRATION & GENERAL

Administrative responsibility devolves upon the mine manager and his assistants. This is the custom in the smaller mining centres. Although Tungsten falls within the Fort Simpson administrative area and is subject to all applicable Ordinances of the N.W.T., contact with Government authorities is rare. The Area Administrator at Fort Simpson had in fact never visited Tungsten in his official capacity.

Health is the immediate concern of the staff of the small hospital operated by the company. Serious cases are removed by air or vehicle to outside points.



## AIRCRAFT LANDING FACILITIES

Tungsten possesses one of the better landing-strips in the Lower Liard Region. It is located a short distance south of the town-site and has a partially granular surface. The length of the strip is approximately 6000 feet and it must be approached parallel to the trend of the valley which is north-west/south-east. A quantity of aviation fuel is usually stock-piled at one end of the strip.

## UTILITIES

A number of pumping stations are established on nearby creeks for the supply of water to the mill and the residential section of the centre. The water is held in storage tanks from where it is fed into distribution systems.

Sewage is disposed of in large septic tanks. Effluents from the mill are settled-out by impounding water in sections of the Flat River.

Garbage is collected regularly and is disposed of at a dumping site south of the centre near the landing strip.

A large power-house is located near the mill and supplies diesel-generated electricity throughout the centre. The power requirements of Tungsten are more than twice those of Fort Simpson.

## EDUCATION

The school at Tungsten is a company day school, as opposed to a federal day school. This means that the school buildings, equipment, heating and maintenance are owned or provided by the mine, but the provision of teachers and supervision is the responsibility of the Education Division, D.I.A.N.D.

The enrollment in the school is all-white and its capacity in all years except 1964/65 was fifty pupils. A further departure from the norm established in smaller population centres is teaching in grades above six. Most schools in the smaller centres have, in the past, cut-off at grade six.

Enrollment data over the past several years are depicted in table 26.

## RECREATION FACILITIES

Tungsten has two buildings which are devoted to recreation/social pursuits. One of these is a curling rink and the other is a large community hall for social events of all kinds.

## COMMERCIAL ESTABLISHMENTS

The pattern has been to include retail outlets of the Territorial Liquor System under the general heading of commercial establishments. One such store has



been established at Tungsten for the sale of alcoholic beverages of all kinds.

A commissary is operated in the centre by the mining company. This retails a variety of articles and is open at certain specified times through the day.

TABLE 26

ENROLLMENT AT TUNGSTEN F.D.S.

| <u>Year</u> | <u>Teachers</u>                                  | <u>1</u> | <u>2</u> | <u>3</u> | <u>4</u> | <u>5</u> | <u>6</u> | <u>7</u> | <u>8</u> | <u>9</u> | <u>Total Enrollment</u> |
|-------------|--|----------|----------|----------|----------|----------|----------|----------|----------|----------|-------------------------|
| 1962/63     | 2  | 4        | 3        | 1        | 3        | 2        | 1        | 2        | 1        | -        | 17                      |
| 1963/64     | school closed due to destruction of mill by fire |          |          |          |          |          |          |          |          |          |                         |
| 1964/65     | 1  | 4        | 4        | 4        | 1        | 5        | 2        | 3        | -        | -        | 23                      |
| 1965/66     | 2  | 6        | 5        | 3        | 3        | 4        | 4        | 3        | 3        | -        | 31                      |
| 1966/67     | 2  | 3        | 6        | 6        | 3        | 2        | 2        | 4        | 1        | 2        | 27                      |
| 1967/68     | 2  | 4        | 2        | 6        | 5        | 1        | 1        | 1        | 1        | 2        | 25                      |

Data Source: D.I.A.N.D., Ottawa.

LAND OCCUPANCY

The occupation of land at Tungsten is in accordance with the provisions of the Canada Mining Regulations. The town-site land is occupied under a ten-year lease arrangement.

POINTED MOUNTAIN

The semi-permanent centre of Pointed Mountain consists chiefly of a number of trailer camps which is a customary arrangement for petroleum companies and their sub-contractors still in the stages of exploration and of establishing more permanent installations. The main camp, or camps, is generally located close to the active drilling site.

A good landing strip is located near the base of Pointed Mountain not far from Fisherman Lake.

The companies occupying the site are: Pan American Petroleum Corporation, the principal company; followed by Kaps Transport Ltd., R.J. Keen Construction Ltd., and Brinkerhoff Drilling Co. Ltd., all of which are sub-contractors to P.A.P.C.

## PRAIRIE CREEK

Prairie Creek consists of one base camp situated on the lower part of an alluvial fan formed by a tributary of Prairie Creek (plate 18). Should this property of Cadillac Explorations Ltd. prove worthy of economic development, it would assume approximately the size of the Tungsten centre in a short time.

There are roughly eight buildings erected on the property. The office, cook-house and associated buildings are constructed of flat-stock, while the bunk-houses use closed wooden walls and floors with canvas roofs.

A landing strip is located a little to the north of the base camp and has a coarse, granular surface. The short strip appearing in the foreground of plate 18 was abandoned as being too hazardous for continued use.

Drilling on the property is carried out for Cadillac by a Vancouver-based drilling company.



Plate 18 - The semi-permanent centre of Prairie Creek as seen from the approach to the landing-strip beyond the left margin of the photograph. The view is to the east and Prairie Creek, which flows toward the lower right corner of the photo, joins the South Nahanni River some thirty miles below.

## CAMSELL BEND

The name appearing above is used to collect together a number of mobile camps and define them, collectively, as a temporary population centre.

The camps might be expected to shift location at frequent intervals in order to fulfill exploration requirements in the area delimited on resources map 7, close to Fort Simpson.

Simpson is used as the jumping-off point for supply and personnel replacement. Operations during the summer of 1968 were under the supervision of Accurate Explorations Ltd.

### TROUT RIVER

Trout River is the last of the two temporary centres recognized by the survey. The centre is fully mobile and Trout River is used to denote its position up to the winter of 1968.



Plate 19 - An aerial view of the Trout River population centre. The photo was taken in August 1968 and the location of the centre at that time was to the east of the Bouvier River.

The centre consisted of 14 large trailer units and was extremely well-organized. Aircraft landing facilities are usually arranged on a straight stretch of the highway whose construction is the purpose of the centre. The Trout River centre, and perhaps others like it, are likely to remain in the Lower Liard Region for some time to execute construction programs of the Governments.

The prime contractor on the highway construction project is Western Construction and Lumber Co. Ltd.



## SUMMARY

Some ten population centres of varying kinds are identifiable in the Lower Liard Region. For ease of understanding and treatment, they undergo a threefold division in the text of the chapter; these are: permanent centres, of which there are five; semi-permanent centres, three; and temporary centres, of which there are two.

The permanent centres have a considerable range in age. The oldest are the forts, Liard and Simpson which trace their beginnings to the beginning of the nineteenth century, and the youngest is Nahanni Butte which dates about 1950. The dating of the remaining permanent centres can only be guessed but are thought to be post-1900.

Fort Simpson is by far the largest of all centres in terms of population, number of buildings, sophistication in utilities and overall Government involvement. Trout Lake is the most primitive and is isolated from most communication systems.

Tungsten is the most modern community of any in the study region and reflects the nearly desperate situation of permanent centres throughout the north unfortunate enough to be removed from the immediate vicinity of economic resource potential.

The semi-permanent centre of Pointed Mountain owes its origin to a hydrocarbon potential which is since proven. Once wells are placed in production, the centre is apt to be much smaller than it is at present, due chiefly to the amenability of the industry to automated systems.

Prairie Creek, the last semi-permanent centre, shows promise of growth. If economic development of the particular mineral resource proceeds, a community approaching the size of Tungsten might reasonably be expected to emerge. Failing such a development, the centre is apt to disappear entirely in a short time.

The temporary centres of Camsell Bend and Trout River are indicative of the type of centre which is likely to appear in increasing numbers in the future. They could prove far more useful to the local economy than has been the case so far.

A truly searching appraisal appears indicated with regard to all of the permanent centres in the Lower Liard Region. The question must be asked whether some of them are located efficiently in relation to the probable parameters for socio-economic development in the region, and whether entrenchment in them should be permitted to continue in some instances.



## CHAPTER 5

### NATURAL RESOURCES

#### INTRODUCTION

Few regions of Canada are endowed with a greater variety of natural resources than the Lower Liard Region. With the possible exception of oil, about every resource that has figured in the economy of Canada is present in the region to the extent that most, if not already contributing, will prove of consequence to the economy as communication systems and populations expand.

In the present chapter, an attempt will be made to identify and show the geographical distribution of the resources and discuss the current extent of their development. No attempt is made at this time to argue the merits of one particular resource over another; nor is the order in which the individual resources are dealt with in this chapter in any way intended to be indicative of their respective importance in the natural resources spectrum as it is presently known in the region.

In chapter seven, certain of the resources are arranged into a priority scale for possible development but the present discussion is best viewed as contributing to the "regional inventory" which has been in the process of building in the preceding chapters of this report.

A word needs to be said about companion maps. These are used liberally in the report, and more especially in this chapter, wherever it was thought that to include them would help convey an understanding of the resources of the region difficult to impart by words alone. The resource maps, when viewed in juxtaposition with other of the companion maps in the report, should be helpful in achieving at least a useful measure of the extra-regional perspective ultimately necessary in the timing of developments for the Lower Liard and perhaps nearby regions as well.

Having said this much about maps, it would perhaps be advisable to caution that resource boundaries which appear on the maps are in some instances only indicative while in other instances they may be rather more accurate than is required in a study of this general nature. For example, only a generalized boundary is possible for encompassing the several gas fields known in the region, while, on the other hand, boundaries for forests and arable land are fixed with considerable accuracy. It is virtually impossible, however, to determine even reasonable habitat boundaries for fauna species; except perhaps in a general way for dall sheep, grizzly bear, woodland caribou and the like. For most other species, their ecological requirements can be satisfactorily fulfilled from the lowest plains areas almost to the tree-line, making the delimiting of habitat difficult or hopeless to map.

Following a general identification of the resources categories under the major divisions of "renewable" and "non-renewable", the chapter will discuss each resource category as a separate part of the chapter. For example, "Fauna" will form Part 1 of the Renewable Division and will be divisible into three parts, i.e. expanded identification of the resource, its distribution in the study region and, finally, the extent of development at the present time. The latter concerns specifically the present magnitude of exploitation if any. The active trapping areas are depicted in map 8 at the end of the section.

It should be made clear that in speaking of exploitation in terms of degree assumes that a great deal is known about actual potential. Such is hardly the case for the majority of the resources in the region. We do not, for example, have even a remote idea of small animal populations so can give only a vaguely qualitative value to the present magnitude of exploitation by assuming that some species are more or less uniformly dispersed over approximate areas, and that only a certain proportion of such areas are being actively exploited at the present time.

Much the same reasoning may be applied to other of the resources. Metallic minerals, another example, are known to occur at widely separated points. From this, and the knowledge that certain of them are already being economically exploited, or are perhaps known to occur in probably economic circumstances, we can assume that a regional potential does occur but remains to be proved, for some minerals at least.

The present chapter does not deal specifically with potential, but it may be alluded to occasionally; in the treatment of the forest resources for instance. It would be well to note, however, that continuity is intended between the contents of this chapter and those of chapter 7, which is developed around some economic aspects of resource potential.

### NATURAL RESOURCES SPECTRUM

The following arrangement identifies the natural resources occurring in the Lower Liard Region and places them into convenient divisions and categories for further discussion.

| <u>Renewable Division</u> |   | <u>Non-renewable Division</u>          |   |
|---------------------------|---|--|---|
| <u>Category</u>           | <u>Sub-Division</u>                           | <u>Category</u>                        | <u>Sub-Division</u>                             |
| 1. <u>Fauna</u>           | Fur-bearing Species<br>Game Species<br>Fishes | 5. <u>Minerals</u>                     | Metallics<br>Hydrocarbons<br>Industrial         |
| 2. <u>Forests</u>         | Softwood Species<br>Hardwood Species          | 6. <u>Park &amp; Re-creation Lands</u> | National Parks Sites<br>Territorial Parks Sites |
| 3. <u>Arable Land</u>     |   |  |   |
| 4. <u>Water</u>           | Fresh<br>Sulphuretted                         |  |   |

PART 1FAUNAIDENTIFICATION

| <u>Fur-Bearing Species</u> | <u>Game Species</u> | <u>Fishes</u> | <u>Other</u> |
|----------------------------|---------------------|---------------|--------------|
| Lynx                       | Grizzly Bear        | Northern Pike | Wolf         |
| Marten                     | Black Bear          | Greyling      |              |
| Beaver                     | Woodland Caribou    | Lake Trout    |              |
| Muskrat                    | Barren Land Caribou | Pickerel      |              |
| Mink                       | Moose               | Whitefish     |              |
| Fisher                     | Dall Sheep          |               |              |
| Weasel                     |                     |               |              |
| Squirrel                   |                     |               |              |
| Fox                        |                     |               |              |
| Wolverine                  |                     |               |              |

DISTRIBUTIONFUR-BEARING SPECIESLynx

The lynx is plentiful in the region. Its habitat is in hilly country and it favours the slopes below the tree-line. The animal possesses great agility and is an excellent climber. Its food consists of the smaller animals such as rabbits, mice and squirrels. Specimens measuring over five feet from the paws of the hind legs to the tip of the nose, when fully extended, are not uncommon.

Marten

This animal competes with the lynx in habitat and food sources. Both the marten and the lynx enjoy wide distribution and, besides inhabiting slopes in the Cordillera, they are to be found in the hills near Trout Lake, around the Horn Plateau, and in the hills to the west of Fort Simpson and south-east of Fort Liard.

Beaver

The beaver is one of the most widely distributed of fauna species in the region. The largest populations inhabit the Interior Plains. Here, there are numerous slow-moving streams and an abundance of smooth-bark trees, both of which are essential to the animal's survival.

The animal also flourishes in some of the higher valleys wherever small meandering streams and suitable bark can be found. In addition to tender barks, the beaver feeds on fishes.

### Muskrat

Slow-moving marshy streams and open water in muskeg areas are the preferred habitat of the muskrat. By and large, the animal is most widely distributed in the low-lying areas of the Interior Plains.

### Mink

The distribution of the mink can be directly equated with the distribution of the muskrat on which it feeds. Another source of food is fishes.

### Fisher

The fisher is relatively scarce in the area, judging by the harvest statistics of several years; but, because a few are caught in the region, they are mentioned. Their behaviour is similar to that of the mink.

### Weasel

The distribution of the weasel conforms nearly to that shown for the mink. The weasel, mink and fisher may be considered competitors for habitat and food.

### Squirrel

Squirrels are very abundant in the region and are thoroughly widespread up to the tree-line at an approximate elevation of 4,000'. They constitute an important part of the diet of lynx and marten.

### Fox

At one time the fox was considered plentiful in the Lower Liard Region but in recent years has declined to where it is no longer an economically important animal. Its decline is associated by some with the decline in the rabbit population over the past several years. Normally, one might expect the fox to be distributed throughout the region because rabbits are known from the lowest elevations to the tree-line.

### Wolverine

The habitat of the wolverine is similar to that shown for the lynx and marten and its distribution therefore is over the higher country. Only very small numbers are ever harvested, but because the animal is so wily, harvest figures are likely not at all indicative of its true abundance.



Detailed descriptions of the fur-bearing animals and their habits, and for that matter, the game animals are avoided by the author. The Canadian Wildlife Service has published an excellent series of pamphlets which discuss each animal in considerable detail. They are available for those wishing to pursue the subject further.

## GAME SPECIES

### Grizzly Bear

This animal is thinly distributed over the Cordillera Province of the region. It is uncommon in the Interior Plains but occasionally descends to lower levels along the western border of the plains. One was reported on the slope of Nahanni Butte (the mountain) early in the summer of 1968, and a number were seen by the crew of a helicopter operating in the valley of the South Nahanni River. Mr. G. Kraus at the "Hot Springs" mentioned seeing the occasional grizzly in that vicinity. No other reports reached the survey.

### Black Bear

The black bear is widely distributed over the Interior Plains and ranges up to the higher valleys of the Cordillera. They are plentiful in comparison with the grizzly.

### Woodland Caribou

This species of caribou inhabits the highland slopes and is, therefore, distributed over the Selwyn and Mackenzie Mountains. The animal usually remains in approximately the same general area all winter, favouring the southerly facing slopes. In years of heavy snowfall, however, it may migrate to the north. It feeds on lichens and willows. The population in the region is unknown.

### Barren Ground Caribou

The animal is distributed sparingly over the Interior Plains in the Lower Liard Region. None were seen during the course of the survey and none were reported. It feeds on mosses and willow shoots.

### Dall Sheep

The upper limits of the tree-line and higher ground are the habitats of this agile animal. It is distributed over the Selwyn and Mackenzie Mountains and is frequently seen in recent years on the Nahanni, Liard and Camsell frontal ranges. Seven animals were sighted on high ledges along the South Nahanni River after entering the first canyon during a reconnaissance by the survey.

A few years ago, local residents felt the animal was becoming seriously scarce but in recent years spottings have been far more frequent, so there is reason to believe that the local population may be increasing.

### Moose

Moose are most plentiful in the Interior Plains but are distributed as well in the broad upper valleys of the Cordillera; such as the valley of the Flat River and above Virginia Falls. The animal is an avid bottom feeder and its habitat usually includes areas of open water and slow moving streams.

### Other - Wolf

The wolf does not fit readily into either of the previous sub-divisions of fauna, but the take is included under game species in table 30. The species chiefly encountered is the timber wolf. Its principal habitat is in the high country close to the woodland caribou, but it is also found on the Interior Plains, in the habitat of the barren ground caribou. The wolf is by far the most active predator in the Lower Liard Region and very often reaches a large size.

## FISHES

### Northern Pike

This fish is abundant in the streams, rivers and lakes of the Interior Plains. Sizeable pike can be obtained in Jean-Marie River, but larger specimens are caught in the Rabbitskin River which enters the Mackenzie from the east, just below Jean-Marie.

### Arctic Greyling

These fishes are members of the trout family and are relatively abundant in the faster moving streams that are not overly-laden with sediment. They are found in most mountain streams tributary to the South Nahanni River, but not in the Nahanni itself. They inhabit the inshore waters of the Mackenzie River, but not those of the Liard River. The greyling caught in the region are not very large, averaging about one pound, but are an excellent sporting fish.

### Lake Trout

Trout of this species are found in Trout Lake, but are very dark in colour. The fish is also caught in the higher lakes such as Cli and Little Doctor at the base of the Nahanni Range, but success did not attend the efforts of the author. Specimens are reported to be large on occasion, however, no reliable values could be obtained.

### Pickerel

The fish is not particularly well distributed in the region but appears to be plentiful in Trout Lake, and some of the streams entering into it. The Indians at Trout Lake settlement claimed weights up to twelve pounds in Island River, but none at that weight were seen when visiting there.

## Whitefish

There is little information regarding the distribution of this fish in the Lower Liard Region. They might be expected, however, in any of the large lakes in the region. The fish is reputed to favour deep water and this added to the surprise when hundreds upon hundreds of large whitefish were found floating in the Mackenzie following the detonation of seismic charges in the river during the summer of 1968. The channel hardly exceeds a depth of four fathoms anywhere.

## DEVELOPMENT

### Fur-bearing Species

The fauna resources have been exploited throughout recent history in the Lower Liard Region, first by the natives as a source of food and clothing, and later by the large trading companies for commercial purposes.

There is general agreement that the fur resources of the region are greatly under-exploited, both in terms of harvesting in presently active trapping areas and in those areas which have been abandoned or have never been exploited by the trapper due to distance, difficulties of access and, perhaps in some instances, due to a decline in animal populations locally.

Many factors conspire to inhibit a revitalization of fur harvesting in the region, and, for that matter, in the N.W.T. as a whole. Perhaps the most important of these factors is the improved ability of the native to discern from which sources he is able to realize the greatest return for the least effort. Almost any wage-labour pursuit of reasonable duration is apt to provide the native with a larger return than is trapping alone.

There are the considerable amenities offered in the settlements and not obtainable on the trap-line. The implications of social assistance cannot be ignored as a factor detrimental to the harvesting of fauna. The author does not mean to imply flatly that the natives do not trap because social assistance is readily available, but it must be said that the situation created for a native and his family who customarily rely upon harvesting for a livelihood is not even fractionally as serious today as it would have been some years ago as a result of his failure to engage in it. There is virtually no stigma attached to social assistance in the region and it would be altogether unreasonable to presume that some trappers are not deterred from harvesting because of its existence.

Other factors much beyond the control of the native, and the authorities as well, enter upon the scene. These have to do with prices at the producer level and lead quite naturally through the whole of the pricing structure to the point of demand, the consumer. The wide fluctuations of the fur market are indicative of its general sensitivity to such things as taste, styling, simulated furs and a periodic aversion to the destruction of wildlife; however intelligent the methods of harvesting control may be.



The N.W.T. Fur Take (1962) shows a steady decline in the harvesting of the more common economic species throughout the Territory. There is, as well, a nearly corresponding decline in the average dollar price for these same species. Moreover, no adjustment is made for the depreciation in the purchasing power of the dollar for the period 1943 - 1961 covered by the study referred to. Of the species considered by this same study marten and mink showed an uptrend in numbers harvested, in the face of a declining average price. Wolverine showed an uptrend in both price and numbers but the species is of little or no importance in the Lower Liard Region.

Generally speaking, the decline noted above for the whole of the Territory appears to have run unabated in the Lower Liard Region as evidenced in tables 27 and 28 which are introduced below. The tables record the number of pelts harvested annually since 1961-62 for both the Fort Simpson and Fort Liard trapping areas.

TABLE 27

HARVESTING - FORT SIMPSON AREA

| <u>Year</u>    | 1961-62 | 1962-63 | 1963-64 | 1964-65 | 1965-66 | 1966-67 | 1967 |
|----------------|---------|---------|---------|---------|---------|---------|------|
| <u>Species</u> |         |         |         |         |         |         |      |
| Beaver         | 1,435   | 1,277   | 1,960   | 2,034   | 1,653   | 1,354   | 1,1  |
| Fisher         | 1       | -       | -       | 1       | 2       | 1       |      |
| Cross Fox      | -       | 6       | 14      | 4       | 5       | 2       |      |
| Red Fox        | 7       | 16      | 52      | 7       | 7       | 7       |      |
| Silver Fox     | -       | 2       | 3       | -       | -       | 1       |      |
| White Fox      | 1       | -       | -       | -       | -       | 1       |      |
| Lynx           | 756     | 1,452   | 740     | 201     | 258     | 98      |      |
| Marten         | 982     | 949     | 1,576   | 1,244   | 1,238   | 1,742   | 1,7  |
| Mink           | 379     | 610     | 293     | 238     | 234     | 141     | 1    |
| Muskrat        | 1,379   | 1,137   | 1,120   | 1,194   | 1,476   | 1,613   | 7    |
| Otter          | 10      | 9       | 7       | 12      | 1       | 2       |      |
| Squirrel       | 3,422   | 2,706   | 978     | 1,696   | 3,021   | 1,066   | 1,6  |
| Weasel         | 107     | 404     | 607     | 322     | 754     | 410     | 3    |
| Wolverine      | -       | -       | 3       | 11      | 3       | 1       |      |

Data Source: D.I.A.N.D., Ottawa and Territorial Fur Returns, Fort Simpson



TABLE 28

HARVESTING - FORT LIARD AREA

| Year           | 1961-62 | 1962-63 | 1963-64 | 1964-65 | 1965-66 | 1966-67 | 1967-68 |
|----------------|---------|---------|---------|---------|---------|---------|---------|
| <u>Species</u> |         |         |         |         |         |         |         |
| Beaver         | 1,243   | 1,138   | 1,112   | 1,489   | 993     | 825     | 498     |
| Fisher         | 7       | 7       | 6       | 2       | 4       | 6       | 2       |
| Cross Fox      | -       | 5       | 3       | -       | -       | 1       | -       |
| Red Fox        | 3       | 4       | 5       | 1       | -       | 1       | -       |
| Lynx           | 796     | 1,630   | 692     | 109     | 102     | 77      | 66      |
| Marten         | 240     | 202     | 300     | 188     | 248     | 283     | 141     |
| Mink           | 178     | 241     | 183     | 93      | 131     | 63      | 78      |
| Muskrat        | 1,380   | 516     | 119     | 484     | 692     | 978     | 587     |
| Otter          | 10      | 5       | 5       | 5       | 6       | 3       | 3       |
| Squirrel       | 2,419   | 947     | 472     | 2,566   | 3,207   | 1,871   | 5,731   |
| Weasel         | 144     | 223     | 307     | 116     | 706     | 425     | 134     |
| Wolverine      | 2       | 1       | 5       | 4       | 5       | 17      | 2       |

Data Source: D. I. A. N. D. , Ottawa and Territorial Fur Returns, Fort Liard

Not included in the table for the Fort Liard area is a sizeable annual harvest taken in Yukon and British Columbia by the Fort Liard migratory group referred to under "populations". There is no official record of this harvest in the N. W. T. so it could not be included in the table. However, its value for the year 1967-68 was obtained and is discussed in the chapter on the economy.

There is no possibility of fixing the numbers of people engaged in trapping in earlier years, and this lack of continuity in recording renders it impossible to properly substantiate statements which allude to the diminishing numbers of full-time trappers over subsequent year; even though this can safely be postulated purely on the strength of the fewer numbers of young people engaging themselves in the pursuit. Moreover, the existing trapping force is subject to wide swings in numbers from year to year, depending on the availability of wage labour and the influence of the market factors explained earlier. It is very difficult, also, to find a wholly acceptable basis for distinguishing between full-time, part-time and casual trappers. In terms of development, therefore, it is deemed proper to presume that the basic full-time force is diminishing, and that the part-time casual force is subject to periodic fluctuations but may in some years become quite large compared to the body of full-time trappers.

During the trapping year 1967-68, it was calculated that the total trapping force in the Lower Liard Region amounted to 171 individuals of Indian and Metis extraction. Complete accuracy is not a claim of the tally. The distribution of the trappers over the two trapping areas was: Fort Simpson/Jean-Marie - 76, and Fort Liard/Nahanni Butte/Trout Lake - 95. Of the 95 shown for the Fort Liard trapping area, 61 were from that settlement itself, and 40 of those were considered by the H. B. C. to be full-time trappers. Part-time and casual trappers can be expected to predominate in the Fort Simpson area because of the greater wage labour opportunity.

The Game Branch of the Territorial Government is fully cognizant of the low exploitation level of the economic fur-bearing species and has for a number of years used its influence to generate interest in trapping as a gainful occupation.

The Branch has used three basic approaches in its efforts to achieve this purpose, e. g. , direct financial assistance, training courses and acting as an agent between the trapper and outside fur auction houses.<sup>1</sup> Local traders also assist the trapper by grubstaking in foodstuffs and equipment, the value of which is later subtracted from the trapper's harvest. The traders are critically discerning as to who they grubstake, and quite rightly so; only those with a history of diligent trapping, and otherwise reliable, can expect to be grubstaked.

The Game Branch continues to actively promote the registration of individual or joint trap-lines but has not been particularly successful. About five years ago, the whole of the Fort Liard trapping area was divided into registered zones containing one or more trap-lines.

By 1968, however, all registrations had lapsed and the Indians showed no desire for a resumption of the practice. From the Indians' point of view, it is impossible to apportion trapping zones so that the trappers enjoy an acceptable measure of equality respecting legitimate access to the particular habitats of many of the several species. This is a reasonable complaint because the fur of all species is not in high demand simultaneously and only rarely, if ever, could registered zones individually hope to encompass the habitats of all species of economic importance in the region. Moreover, the registration of zones implies a pseudo-

---

1

The financial assistance is in the form of cash advances, or grubstaking, which the trapper is expected to repay from the proceeds of his forthcoming harvest. The training courses are conducted in the field by officers of the Game Branch and concentrate on the youth of the community. In the role of "agent" the Branch receives the trapper's harvest and arranges for shipment to the south, usually Edmonton. The trapper is then issued a chit on a local merchant to the partial value of his harvest. Following the fur auction, the auction house subtracts the advance represented in the chit, plus a commission, and sends the balance in cash directly to the trapper concerned; the object is to obtain a better price for the trapper by eliminating the trader. Other aspects of this innovation are discussed in the chapter on the economy.

ownership of fauna resources which, in the study region at least, is counter to the Indians' belief that such resources belong to the band in common. The old registrations are shown in a dashed line on map 8.

In concluding the discussion on the fur-bearing fauna, it would appear altogether reasonable to theorize that, in the absence of price increases for raw pelts of an order beyond all possible expectation, but essential if harvesting is to look for a recovery equal to or better than levels achieved in the late 1930's and early 1940's, the peak of development would appear to have occurred at some time in the past. As is happening on the mainland N. W. T. generally, the harvesting of fur-bearing fauna in the Lower Liard Region is quite likely to assume successive positions of declining importance as other resources are tapped.

### Game Species

These are of minor importance in the cash economy but are important in other aspects of the native economy. All species are under strict control by the game authorities and cannot be spoken of in terms of development within the context of its use in this chapter. Although incomplete, the tallies offered in tables 29 and 30 give some idea of the take in the two trapping areas and their vicinities.

The game species are likely underexploited in terms of sports hunting; there being only one game outfitter licenced in the region. But, here again, there are strict controls which necessarily, and fortunately, preclude exploitation on a sizeable scale.

TABLE 29

#### TAKE OF GAME SPECIES - FORT SIMPSON AREA

| Year                     | 1966-67 | 1967-68 |
|--------------------------|---------|---------|
| <u>Species</u>           |         |         |
| Moose                    | 77      | 177     |
| Caribou (Barren Ground)? | 22      | 54      |
| Black Bear               | 29      | 64      |

Data Source: Game Branch, Fort Smith

NOTES: The tally in 1967-68 accounts for kills made by 44 licence holders out of a total of 125 issued to the residents of Fort Simpson and Jean-Marie. The balance had not reported at the time of the survey.



TABLE 30

TAKE OF GAME SPECIES - FORT LIARD AREA

| Year       | 1957 | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 | 1965 | 1966 | 1967 | 1968 |
|------------|------|------|------|------|------|------|------|------|------|------|------|------|
| Species    |      |      |      |      |      |      |      |      |      |      |      |      |
| Moose      | 135  | 104  | 121  | 139  | 150  | 175  | 160  | 97   | 120  | 90   | 109  |      |
| Caribou    | 21   | 10   | 15   | 30   | 25   | 20   | 15   | 13   | 22   | n/r  | n/r  |      |
| Dall Sheep |      | 8    | 11   |      |      |      | 1    | 2    | 2    |      |      |      |
| Goat       |      |      |      |      |      |      |      | 1    |      |      |      |      |
| Black Bear | 37   | 39   | 17   | 26   | 20   | 28   |      | 22   | 20   | 16   | 18   |      |
| Grizzly    |      |      |      |      |      |      |      |      |      | 1    |      |      |
| Wolf       | 3    | 8    |      | 8    |      |      |      | 13   | 1    | 4    | 11   | n    |

Data Source: R.C.M.P., Fort Liard Detachment

NOTES: The tally includes, as well as Fort Liard, Nahanni Butte and Trout Lake. There were 81 licence holders in the aggregate in 1968 but the tally for that year was based on the reporting of only 34 of them. All caribou were assumed to be of the barren ground species.

Fishes

As regards development, the fishes must be placed in roughly the same category as game animals in the Lower Liard Region. Fishes are relatively abundant but the water systems are either too small or are too sediment-laden to support fish populations sufficiently large for the development of a viable fishing industry. On the other hand, fishes are of considerable importance as a food source in the local economies and could perhaps stand increased exploitation for that purpose.

The proximity of the Lower Liard Region to the vast and well-developed fisheries of Great Slave Lake would tend also to negate worthwhile development in the study region; assuming fish populations were large enough for commercial development in the first place.

Fishes are harvested regularly by the Indians for human and dog food. The principal lakes in which harvesting occurs are: Trout, Sibbeston and Fisherman. A few of the rivers are also fished on a regular basis.

The recording of the annual harvest of fishes does not appear to have been consistent or continuous, nor was an attempt made to identify the proportion of species in the data that were recorded. The tally shown in table 31 is included to give some appreciation of the size of annual catches that had been recorded.



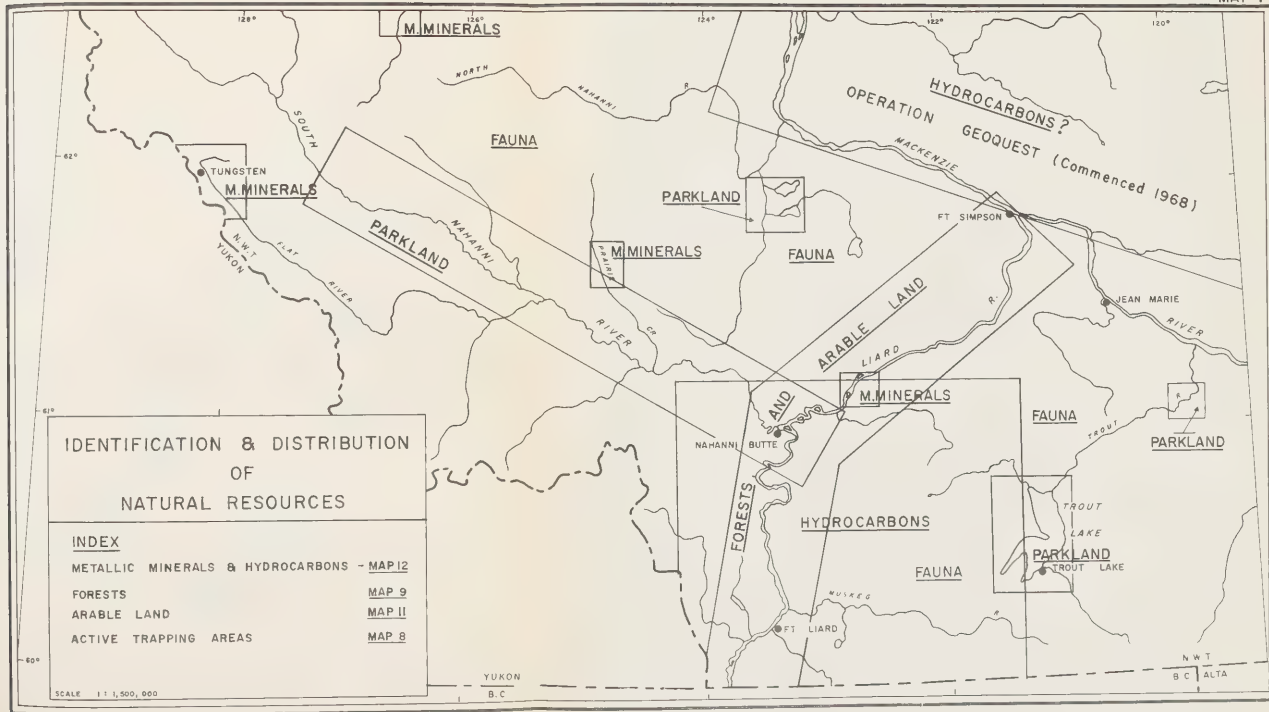
TABLE 31HARVEST OF FISHES - LOWER LIARD REGION

| <u>Year</u>             | 1962        | 1965        | 1966        |
|-------------------------|-------------|-------------|-------------|
| <u>Locale</u>           |             |             |             |
| Fort Simpson/Jean-Marie | 22,500 lbs. | 2,880 lbs.  | ?           |
| Fort Liard              | 44,700 "    | ?           | ?           |
| Trout Lake              | 73,000 "    | ?           | 23,000 lbs. |
| Nahanni Butte           | 5,400 "     | ?           | ?           |
| Jean-Marie              | ?           | 20,000 lbs. | 15,000 lbs. |

Data Source: D.I.A.N.D. Semi-Annual Reports of Indian Agent, Fort Simpson

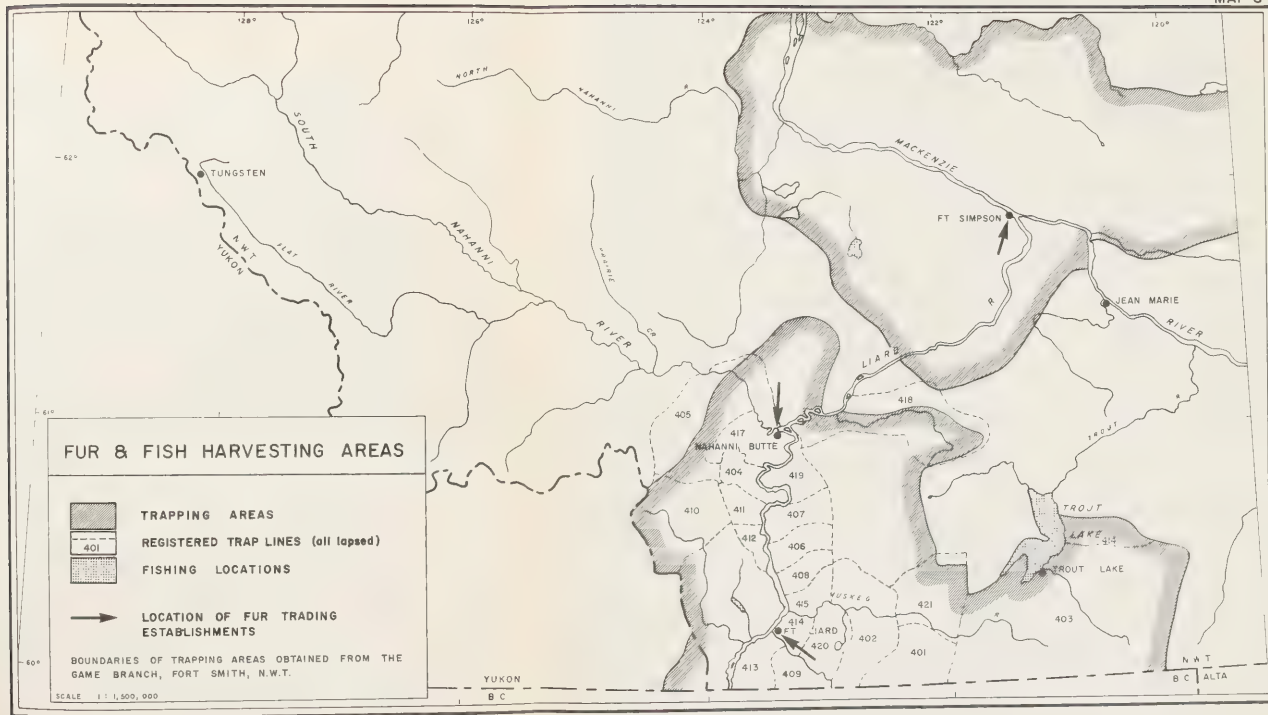
The common species harvested by the Indians are Lake Trout, Whitefish and Pike. The proportion of Pike is usually substantial and serves chiefly as dog food.













PART 2FORESTSIDENTIFICATION

| <u>Softwoods</u> | <u>Hardwoods</u> |
|------------------|------------------|
| White Spruce     | Balsam Poplar    |
| Black Spruce     | Trembling Aspen  |
| Lodepole Pine    | White Birch      |

DISTRIBUTION

It will suffice for this study to define the forested areas occurring in the Lower Liard Region (Map 9). Any attempt to position stands of one species or another, or mixed stands, would not be particularly relevant to the broad objectives of the report and, moreover, would be superfluous to the detailed work of Hirvonen (1965) on the Lower Liard River.

Two large and contiguous concentrations of merchantable stands occur in the valley of the Liard River. One is centred about Nahanni Butte and the other about Fort Liard. These are designated area "A" on the map. A much smaller area of forest cover occurs along the Liard River between the Poplar River and Fort Simpson, and is designated area "B".

Forest Area "A" is distributed over nearly 528,000 acres of land which is generally flat and fully accessible during the winter months. Forest Area "B" is distributed over roughly 50,000 acres and possesses the same attributes of topography and accessibility mentioned for Area "A".

The geographic location of Area "A" must be considered highly desirable when viewed in the light of its proximity to southern routes either existing or proposed.

Development

No exploitive developments of any account have taken place with regard to merchantable forests in the valley of the Lower Liard River. A small sawmill operation has been established at Fort Simpson for many years (Area "B") but no record of total cutting on its permits could be obtained. It is doubtful, however, that production has exceeded 3 - 5 million FBM over the history of the operation. A small native-owned sawmill has been in operation in and around Jean-Marie for several years, and a second small mill was in operation near the same settlement, on the right bank of the Mackenzie River, for a number of years but closed down on the death of its owner a few years ago. These latter mills are outside the prime forest areas but are mentioned to complete the picture on sawmill operations up to the present time.

When considering the state of development of a particular resource, we must also make mention of any program devised by the authorities to protect or enhance the resource while awaiting the commencement of exploitation.

Three things can endanger merchantable forests; namely, fire, blight and indiscriminate harvesting. At the present state of development of the prime forests, the first mentioned hazard is of the greatest immediate importance. Patches of spruce bud-worm infestation are known to occur in Area "A", but the particular composition of the forest cover and the climate inhibit the rapid spread of the disease. All cutting is on a permit basis so there seems little danger of incurring excessive damage as a result of indiscriminate harvesting.

All forests in the N.W.T. are the direct responsibility of the D.I.A.N.D., and the matter of fire control falls upon the Mackenzie Forest Service, an arm of the D.I.A.N.D. From its area base at Fort Simpson, the Service is responsible to act in fire control over the area depicted in map 9.

In order to accomplish this the service relies upon a sub-station and fire-tower at Fort Liard manned by one full-time and one part-time employee. Map 10 shows also that fire-towers are planned at Nahanni Butte and at a mid-point on the Liard River as well. Fire warnings might also be transmitted by the residents of Nahanni Butte, Trout Lake, Jean-Marie and over-flying aircraft, but these are not part of the official organization.

As in most Provinces in the country, fire-fighters can be conscripted and delivered to the fire site. The Service has an assortment of portable water pumps, saws, and hand tools to bring to bear, but must rely upon the availability of local charter-aircraft for transportation.

It would be of interest at this juncture to summarize fire activity for the period 1963 - 1967 and show the method of fixing the value of resources destroyed by this hazard.

TABLE 32

SUMMARY OF FIRE ACTIVITY IN PROTECTED AREA

| Years | Area    | No. of Fires | Acres<br>Burned | Fire<br>Fighters | Cost of<br>Control (\$) | Value of Resource<br>Destroyed (\$) |
|-------|---------|--------------|-----------------|------------------|-------------------------|-------------------------------------|
| 1963  | Liard   | 22           | 16,228          | 119              | 12,159                  | 29,716                              |
| to    |         |              |                 |                  |                         |                                     |
| 1967  | Simpson | 49           | 89,675          | 273              | 45,669                  | 129,918                             |

SUMMARY OF FIRES OUTSIDE THE PROTECTED AREA  
(not fought)

|      |         |    |        |  |  |        |
|------|---------|----|--------|--|--|--------|
| 1963 | Liard   | .4 | 15,525 |  |  | 28,250 |
| to   |         |    |        |  |  |        |
| 1967 | Simpson | 22 | 72,219 |  |  | 83,079 |

Data Source: Mackenzie Forest Service, Fort Simpson



The present criteria for arriving at a valuation of destroyed forest resources is:

|                 |                  |              |                  |
|-----------------|------------------|--------------|------------------|
| Muskeg          | \$ 0.25 per acre | FBM          | \$ 1.00 per acre |
| Immature Timber | 2.00 per acre    | Green Timber | 0.50 per acre    |

The values assigned to the immature and FBM timbers will certainly require upgrading for a more realistic appreciation of the potential which is lost through fires. Although it is not possible to ascertain from the table the extent to which each category was affected, it may safely be assumed that a large proportion of the 16,228 acres burned in the protected belt in forest area "A" consisted of valuable timber.

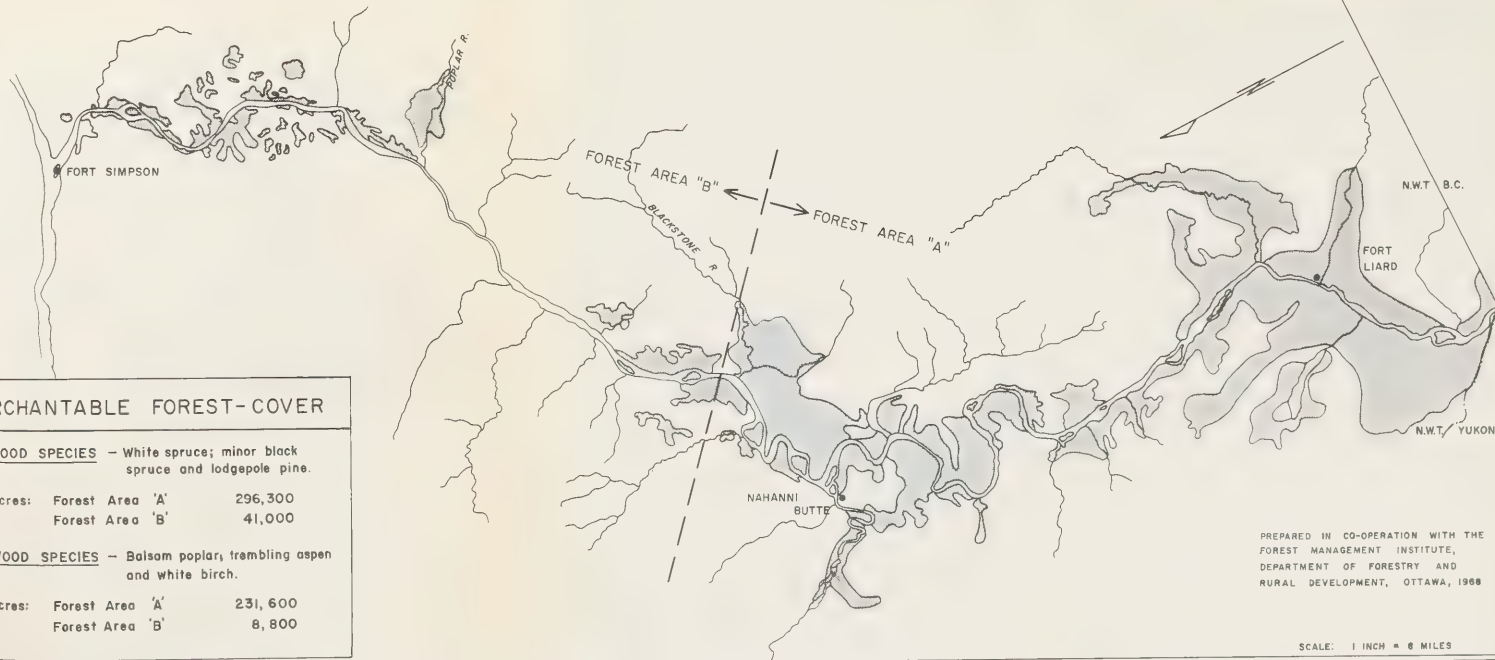
As a matter of interest, the summary of area and volume for mature timber types appearing in appendix 10 lists an aggregate acreage of merchantable softwoods under cover type 3S2 in area "A" amounting to 15,600 acres. If we accept this as being nearly equivalent in area and type to the burned acreage of 16,228 shown for Fort Liard in table 32, then we might better appreciate what could be lost to the future economy of the study region. The 15,600 acres in question is estimated to possess the equivalent of 38,600,000 FBM in mature timber, mostly white spruce. At current export prices, the timber so destroyed would have had a potential value of roughly \$3,500,000.

The Forest Management Institute of the Department of Forestry and Rural Development carried out a forest inventory survey which established the cover types and general volumetric estimates for merchantable timber in the Lower Liard Region. This was done in 1955 and the work was published in 1968. The economic potential is discussed in chapter 7 of this report.

Additional inventory work has been carried out by the Swanson Lumber Co. Ltd., and, in 1968 this same company was engaged in timber cruising in cooperation with members of the Mackenzie Forest Service.

To conclude, developments with respect to the forest resources have been progressing toward exploitation for some years. Sufficient is known about these resources to show that economic exploitation is possible as soon as contemplated transportation routes materialize. Of key importance in the matter of exploitation is the extension of the present railway from Fort St. John to Fort Nelson, B.C. The construction of this railway which has already been proposed by the Government of British Columbia for the development of its own resources in general area, would be an event of the first magnitude for the Lower Liard Region.





# **MERCHANTABLE FOREST-COVER**

**SOFTWOOD SPECIES** — White spruce; minor black spruce and lodgepole pine.

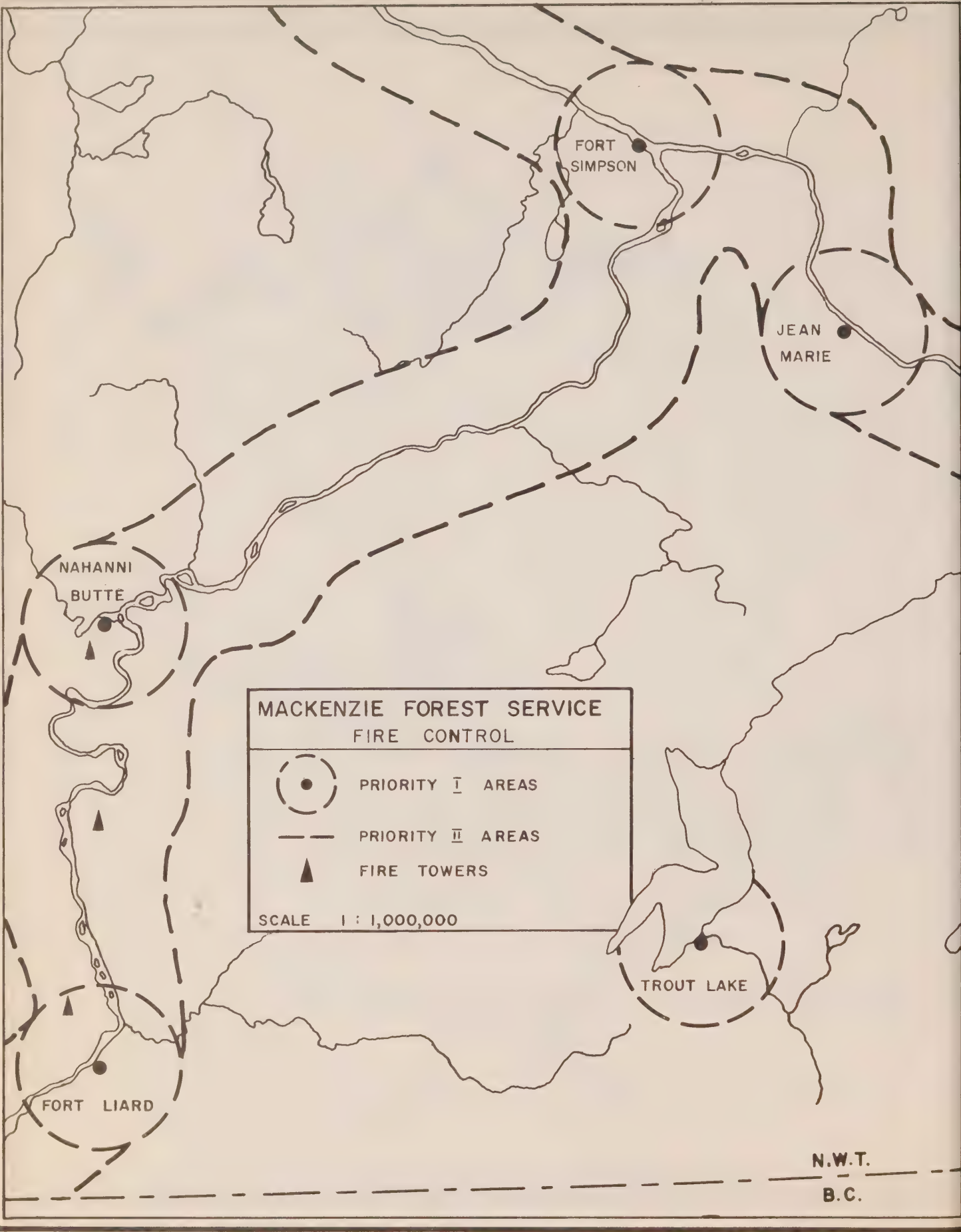
Acres: Forest Area 'A' 296,300  
Forest Area 'B' 41,000

**HARDWOOD SPECIES** — Balsam poplar, trembling aspen and white birch.

Acres: Forest Area 'A' 231,600  
Forest Area 'B' 8,800

PREPARED IN CO-OPERATION WITH THE  
FOREST MANAGEMENT INSTITUTE,  
DEPARTMENT OF FORESTRY AND  
RURAL DEVELOPMENT, OTTAWA, 1968

SCALE: 1 INCH = 8 MILES





### PART 3

#### ARABLE LAND

##### IDENTIFICATION

Further identification in the resource category of arable land is best left to the legend appearing in companion map 11. Otherwise it would be necessary to delve into sub-division based on a differentiation of soil types. Comprehensive surveys on the soils of the Lower Liard Valley, and also those along the Mackenzie River between Forts Simpson and Providence, were conducted by the Research Branch, Canada Department of Agriculture in recent years and provide a wealth of valuable information relating to the composition, texture and moisture regime of the soils encountered.

Most of the content of Part 3 results from a reworking of certain of these earlier data to an extent sufficient to introduce this particular resource into the inventory of natural resources.

##### DISTRIBUTION

The areas underlain by soils deemed most suitable to agricultural pursuits conform approximately to the area or areas occupied by merchantable forests identified in Part 2 of this chapter. A second belt of arable land occurs along the northern fringe of the study area on the south side of the Mackenzie River, as was noted earlier. Of chief concern to the study is the first of these.

In the valley of the Lower Liard River there are nearly 1,092,800 acres deemed to be suitable for the development of agriculture. The best land appears to be distributed close to the river course and consists of soils of recent deposition occurring in the form of small flood plains, low terraces and on the concave side of river bends. These are very suited to the production of cultivated crops, especially hardy vegetables, but would be suitable for other crops as well. The topography resulting from these kinds of deposition is usually quite flat.

Away from the river the quality of the soil changes not only in composition but also due to considerations of slope and moisture as well.

North from Nahanni Butte the arable land assumes a patchy distribution which disrupts contiguity. This is opposed to the considerable contiguity in arable land to the south. There results an area of approximately 400,000 acres of arable land north from Nahanni Butte, and very nearly 700,000 acres south from it.

## DEVELOPMENT

Developments in agriculture have been confined, so far, to the activities of the Experimental Farm at Fort Simpson and to the cultivation of a very few acres in and about the permanent settlements by interested institutions and individuals.

As has been noted already in this report, the Experimental Farm has produced voluminous data on the raising of various crops in the vicinity of Fort Simpson over a period of many years. Much of this accumulated information, or perhaps all of it, will find very valuable application when and if agriculture becomes established in the Lower Liard Region.

Crops of hardy vegetables thrive in the study region and have served those communities well who have taken the time and made the effort to clear, break and work the soil. Apart from the acknowledged purposes of the Experimental Farm, and the necessity for its staff to engage in agriculture, the Catholic Mission has a long history of crop raising to its credit which persists to the present day, but on a reduced scale. Sacred Heart Mission (1958) makes occasional note of agriculture production in certain years, but, unfortunately does not present a continuous record over a useful period. The largest potato crop appears to have been produced in 1930 and amounted to 630 sacks. Eighty sacks of carrots and 6,300 eggs were produced the same year. Two tons of beef were produced in 1930, and 600 pounds of butter in 1942. As production commenced in 1919, and was continuous for many years, an impressive record of production must have been achieved. The Mission did, as well, raise modest quantities of grains and hay for winter cattle feed.

The Indians offer little evidence of interest in the production of food crops, if one is to judge from the available evidence. Some in Fort Simpson have kitchen gardens; a few have planted small plots in Nahanni Butte and Jean-Marie, but the best kitchen gardens appear to have been cultivated by government personnel; those least needing to do so.



Plate 20 - Kitchen garden at Fort Liard, August 1968.

Arable land in the Lower Liard Region must assume increasing importance with each passing year, but development on a meaningful economic scale is likely some years away. (map 11)

## PART 4

### WATER

#### IDENTIFICATION

The identification of water resources falls into the two sub-divisions explained in the introduction to the chapter; namely, fresh and sulphuretted. Fresh water resources can be associated with, or related to, fields such as irrigation and hydro-electric power development, besides its domestic and industrial applications.

Sulphuretted waters occur in the Lower Liard Region as thermal springs, and, as a resource, are closely associated with park and recreation lands, the subjects of a subsequent part of this chapter.

#### DISTRIBUTION

Fresh water is widely distributed throughout the Lower Liard Region and is present in very large volumes at all times. Map 4, included with the chapter on the physical environment, shows the relative distribution of surface water within the study region and rates of discharge for the larger rivers are given in the hydrological section.

Thermal springs are known in two locations; one of these is located near Tungsten and the other in the valley of the South Nahanni River. A third spring occurs higher in the same valley, above Virginia Falls, beyond the limits of the study region.

#### DEVELOPMENT

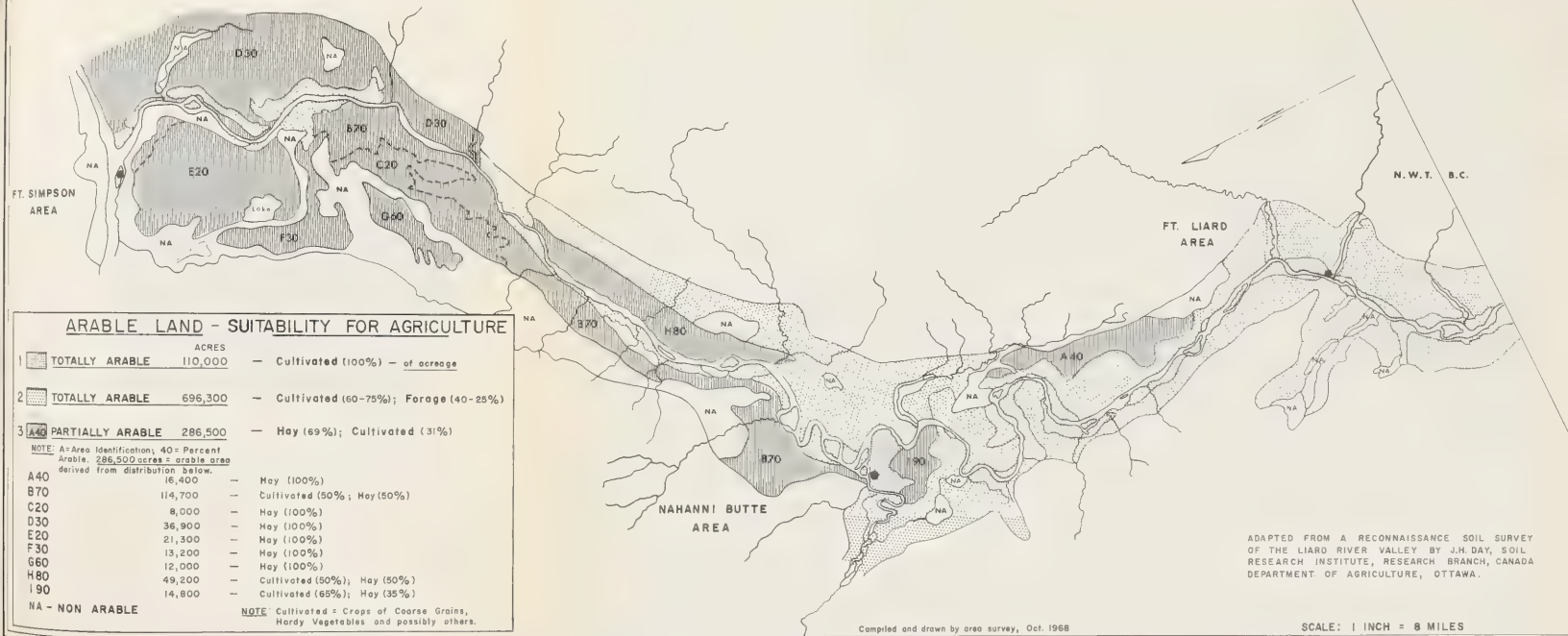
No development which concerns fresh water directly as a saleable resource, or indirectly through its utilization in hydro-electric power development, has so far occurred in the region. Its use in irrigation is not contemplated at the present time but could very well prove of economic consequence in the future.

Studies were carried out on the South Nahanni River (Chin 1962) to assess its power potential. The study visualized a main dam structure at Virginia Falls, and the possibility of several others downstream having an output potential of roughly 850,000 kilowatts.











Before a Hydro-electric power development of this magnitude, in an area so remote, could be seriously considered, the possibility of power generation using locally available natural gas would have to be assessed on the basis of comparative economics.

The thermal springs in the region are properly considered a resource deserving consideration in connection with the future development of parklands. To date no development has attended the discovery of these springs, and perhaps only those occurring at "Hot Springs" on the South Nahanni River will warrant attention in the foreseeable future (Plate 21). Flow and temperature data for the "Hot Springs" location were given under the section on general hydrology.

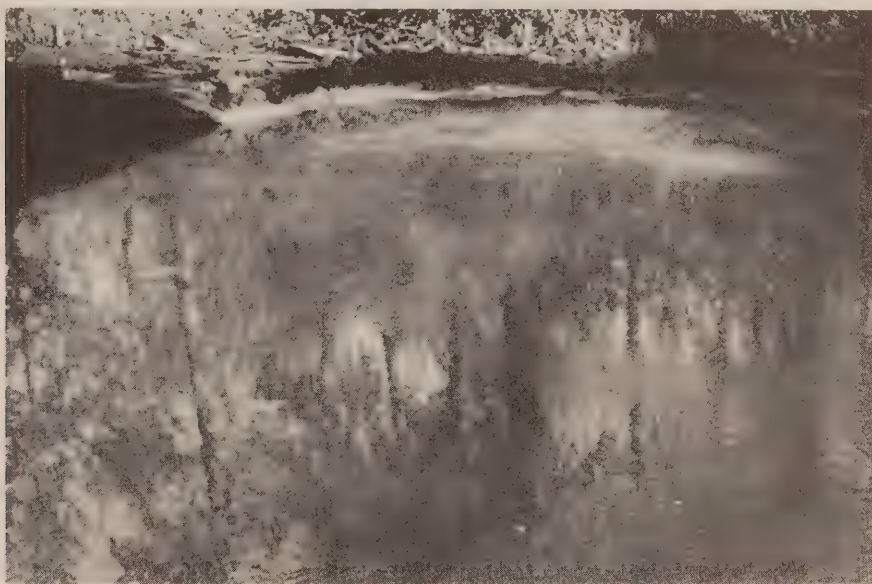


Plate 21 - One of the thermal pools at "Hot Springs" on the South Nahanni River. The water is impounded by a crude earth dam appearing in the upper part of the photo. The pond has a diameter of roughly fifteen feet and a maximum depth of about three feet. New water is introduced through numerous openings in the bottom of the pool and can be seen breaking at the surface.

PART 5MINERALSIDENTIFICATION

| <u>Metallic</u>     | <u>Hydrocarbon</u> | <u>Industrial</u> |
|---------------------|--------------------|-------------------|
| Tungsten            | Natural Gas        | Gravel            |
| Lead, Zinc & Silver | Oil                |                   |
| Copper              |                    |                   |
| Gold                |                    |                   |

DISTRIBUTION

The actual limits of distribution of most of the minerals listed above are not yet fully known so any reference to belts, areas, zones and the like are made with the full knowledge that they may be more, or less extensive than indicated in the discussion. Companion map 12 shows occurrences of the minerals along with claims, permits and leases.

METALLICSTungsten

The tungsten mineral scheelite occurs in a number of places in close proximity to the late granitic intrusives which form a belt trending north-west/south-east in the valley of the Flat River. Copper minerals, in most instances, occur in association with the scheelite.

Lead, Zinc, Silver

These minerals occur in close association with one another and mineralization is comparatively widespread in the Cordillera Physiographic Province within the Lower Liard Region. The occurrences are usually related to faulting and shears in the sedimentary sequence. Copper minerals, again, are associated with some of these occurrences and in the case of the northernmost showings (Redstone Mines), copper predominates over the other minerals mentioned.

Copper

This mineral has been mentioned already as being associated with others, but it occurs in its own right at Nahanni Butte (mountain) and about 35 miles below Nahanni Butte on the Lower Liard River. Zoning cannot be reasonably applied to the mineral due to the present paucity of known occurrences.



## Gold

The mineral has been noted in a number of placer deposits occurring on Bennett and McLeod Creeks, and at the mouth of the Flat River.

## HYDROCARBONS

Natural gas is widely distributed over the Interior Plains in the Lower Liard Region, but the largest potential producing fields are located on the eastern edge of the Liard Plateau just to the west of Fort Liard. Some oil was noted in the fields north-west of Trout Lake but was not considered of economic interest.

According to Douglas, Norris, Thorsteinsson & Tozer (1963: p. 3) the Netla and Celibeta gas discoveries in the Great Slave Plains, a sub-division of the Interior Plains covering about one half of the study region, occur in late Middle Devonian carbonates and are a northern extension of the gas belt of northern British Columbia.

The distribution of the areas of discovery are depicted in map 12 and consist of the several gas fields discovered south of the Mackenzie River. The area adjoining it to the north, labelled "hydrocarbons", is an area of active interest. Together, these pretty much define the distribution of hydrocarbon resources as presently understood.

## INDUSTRIAL MINERALS

Gravel occurs in a moraine situated to the rear of Fort Liard, Substantial deposits occur also in the valley of the South Nahanni River several miles above Nahanni Butte.

## DEVELOPMENT

### Tungsten

The exploitation of this mineral is the most highly developed of any in the Lower Liard Region. The Canada Tungsten Mining Corporation Ltd. commenced mining scheelite from a deposit near the upper reaches of the Flat River several years ago and has the unique distinction of being the only producing tungsten mine in Canada at the present time. The entire output of tungsten is exported to the U.S.A.

Initial development of the deposit commenced in 1959, and in 1962 a permanent camp and a 300 ton-per-day mill had been erected and was put in operation in November of the same year. According to L.H. Green (1964: p. 50), between the time the mill opened and September 1963 some 83,664 tons of ore were milled. The product proved unacceptable to the potential customers for quality reasons and the operation was halted pending further laboratory testing. This circumstance happened to coincide with a depression in the market price of Tungsten.

Mining was resumed in June 1964 and was followed by milling in October. By the end of that year about 33,543 tons had been milled (Green) (1964: p. 51). The operation appears to have proceeded uninterrupted through 1965 because Green (1965: p. 84) states that about 108,000 tons of ore were milled resulting in the production of 4,000,000 pounds of concentrates during that same year.

In December 1966 production was halted by the destruction of the mill by fire, but Finlay (1967: p. 68-69) mentions that in the year of the fire 115,568 tons of ore were milled resulting in the production of 4,260,440 pounds of  $\text{WO}_3$  concentrates. At the same time, the production of copper amounted to 318,121 pounds.

Following the fire, the mining and stock-piling of ore continued until a new 350 ton per-day-mill was constructed and put into production late in 1967. It was operating steadily at the time of the author's visit in the summer of 1968.

Concentrates are produced by two methods, i.e., gravity or flotation. The ores amenable to the gravity process produce a product grading 72 - 76%  $\text{WO}_3$ , while those subjected to flotation concentrate to 35 - 45%  $\text{WO}_3$ . The latter are further concentrated at the Vancouver roasting plant to produce a product roughly equivalent to the percentage obtained by the gravity method. Copper, a by-product of the mine, is concentrated to 25% Cu.

Mining is by the open-pit method at a location with a vertical elevation of 1,300 feet above the town-site. The ore is trucked to the mill over a switch-back road some three miles in length. Mining is only possible throughout the less harsh months, roughly May to October, and sufficient ore must be stock-piled near the mill to ensure its operation during the winter. (Plate 22).

Mill concentrates are trucked daily to Watson Lake where they are transferred to long-distance road transport to Fort St. John, B.C. From there, transport is by railway piggy-back to Vancouver, B.C.

The company was engaged in an active exploration program in 1968 to discover additional ore and plans to continue this exploration in subsequent years in an effort to extend the life of its milling facility by the location of additional ore reserves.

The investment of the Canada Tungsten Mining Corp. Ltd. in its property at Tungsten, N.W.T. is estimated by the author to be approximately \$10,000,000. This was arrived at by using details from an engineering design study carried out for the company at an early date; its contribution to the construction of the Cantung Access Road and the landing-strip, together with allowances made by the writer for the improved town-site and some residual cost in replacing the destroyed concentrating plant or mill.





Plate 22 - Open-pit of the Canada Tungsten Mine, Tungsten, N.W.T. The elevation of the open-pit is 4800 feet A.S.L. and the switch-back road leads away from the pit towards the lower right corner of the photo, arriving ultimately at the mill below.

### Lead, Zinc, Silver

Two companies are, and have been for some time, actively engaged in exploratory work on occurrences of these minerals. They are: Cadillac Explorations Ltd. on its property near Prairie Creek, and Redstone Mines Ltd. on its property in the vicinity of Little Dal and Plateau Lakes. The bulk of the Redstone property lies just beyond the northern boundary of map 12 but enough of it projects into the Lower Liard Region to warrant mention of the company and its activities in the report.

Cadillac Explorations Ltd. was granted a prospecting permit in 1966 comprising 182,500 acres in which mineralization was known to occur at several locations. Since then, several interesting vein systems have been uncovered. The company must stake claims on the expiry of the prospecting permit in 1969.

Mineralization occurs in a zone of banded grey and black shaly-limestone, probably of middle-Devonian age. Intrusives are not exposed in the area.

In 1968 the company had driven an adit into one of the vein systems to a depth of 108 feet and had commenced exploratory drifting. A drilling program was begun in the winter of 1967/68 and was in progress throughout the following summer, but no tonnage estimates appear to have been publicized.

Advice from the company's consulting engineer was to the effect that, should the property be placed in production, the open-pit method of mining would be employed and a 400-500 ton-per-day mill would likely be required. A winter road was to be driven from the base camp on Prairie Creek in the fall of 1968, following the Ram River to reach barge transportation at Camsell Bend on the Mackenzie River.



Plate 23 - On the location of the Cadillac number two vein system. The widespread nature of mineralization is indicated by the extensive road system connecting the several mineralized locations so far discovered.

There is no way of accurately estimating the magnitude of expenditures by Cadillac Explorations Ltd. in developing its property on Prairie Creek, but the amount budgeted for 1968 alone was in the order of \$225,000 which included up to several hundred feet of drifting and cross-cutting, and substantial surface diamond drilling. This work was well advanced at the time of the author's visit.

A good deal of surface work was also carried out in the previous two years so the company's investment to date might reasonably be estimated at between \$5 - 600,000. This amount would include the movement and purchase of two Caterpillar tractors which must have cost nearly \$100,000 by the time they arrived on the property.



### Lead-Zinc-Silver-Copper

The property of Redstone Mines Ltd. is located about 80 miles north of Tungsten, and should the property go into production at some future date, the shortest practicable route into British Columbia would seem paramount. The routing selected is very apt to be via Tungsten, even though the difficulties posed by topography are many.

In 1968, the company staked an additional 48 claims bringing its total to 639 claims in good standing. Mineralization, according to Green (1964: p. 51), occurs mainly in three persistent beds of green, carbonate-rich rocks found at the top of nearly 1000 feet of mudstone and siltstone. Mineralization has been traced over 4 miles. Green alluded only to copper in the above description, but mentioned also that three zones of zinc and lead mineralization were encountered at a depth of 900 feet in one drill-hole.

The company's fifth annual report in 1965 indicated the zoning of five groups of claims with mineralization identified as follows: copper/silver; silver; copper; copper; lead/copper/silver. The zones are spaced roughly fifteen miles apart in a northerly-trending belt of mineralization.

Since 1960/61 Redstone Mines Ltd. has expended over \$600,000 in exploration in the Nahanni Mining District, most of it on the properties in the vicinity of Plateau Lake. The geochemical and geophysical program mounted during 1968 would constitute expenditures additional to the aforementioned sum.

About 23,044 feet of drilling was completed in 1963-64 but was insufficient to establish tonnages to be expected on the holdings. In 1968 the company carried out a geophysical, geological and geochemical program which resulted in the additional staking mentioned earlier. An unfortunate air accident claimed the lives of a number of people connected with the program and destroyed some of the survey results. However, sufficient of the data were saved on which to base further exploration work and the company continues to encourage interest in the development of the holdings.

### Copper

Slightly in excess of 700 claims have been staked on the Liard River about 35 miles below Nahanni Butte in an area of copper mineralization. The principal holders of the claims are Mt. Hyland Mines Ltd. and Ramada Mines Ltd.; but, a fairly large proportion of the total claims are held also by several residents of Fort Simpson.

Drilling was in progress on some of the properties in the winter of 1967 and the spring of 1968, and is expected to continue in the winter of 1968. The results of this work were not available.

Copper sulphides are exposed at the butte after which the settlement of Nahanni Butte is named. This mineralization, first reported by Douglas & Norris (1960: p.26), has not been systematically explored.

### Gold

Potential placer deposits are known to occur in certain tributaries of the Flat River. All were reported on by Lord (1951: p. 265). Years ago the placers on Bennett Creek were worked in a very small way by some of the white settlers of the study region, and a minor rush occurred in 1933 in connection with these placers when many residents of Fort Simpson made their way into the Nahanni country to stake claims. None was ever economically developed. (Sacred Heart Mission 1958: p. 46)

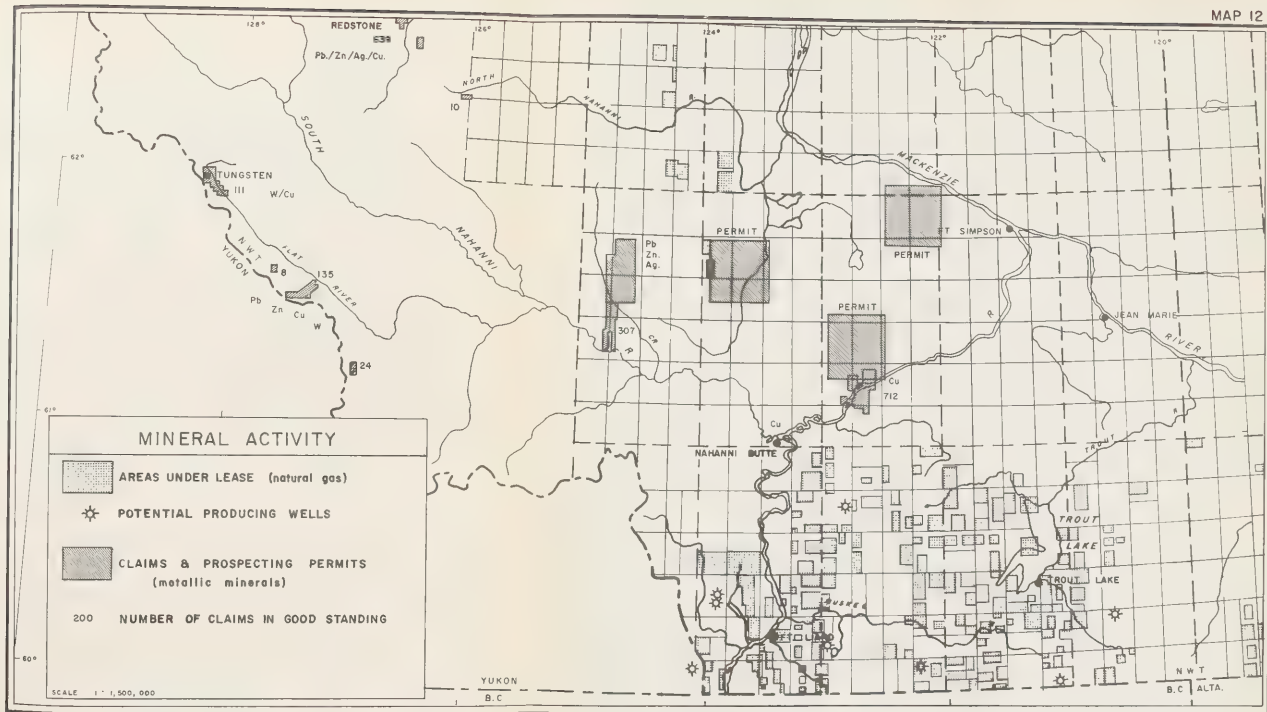
## HYDROCARBONS

### Natural Gas

Exploration for natural gas and oil in the region dates back to the early 1950's, and, up to the present time, about seven potential producing-fields have been proved in the Lower Liard Region. This is the result of drilling approximately fifty wells, most of which were either dry or so low in potential as to be uninteresting economically. Map 12 shows the distribution of the potential producing wells. By far the largest potential producer in the region is the Pointed Mountain field of the Pan American Petroleum Corporation. This company has completed two wells at Pointed Mountain and was actively drilling a third well in the summer of 1968. A fourth well is planned following completion of the latter.

According to a personal communication from the Oil & Gas Administration, D. I. A. N. D. , Pan American Petroleum Corp. has entered into a contract with West Coast Transmission Co. for the construction of a 20-inch pipeline to service the Beaver River/Pointed Mountain fields, provided sufficient reserves could be proved and permission granted to export the gas to the U.S.A. The communication also states that this development, together with the fact that the region contains many leases and old exploration permits which require increased expenditures to keep them in good standing, indicates that a high level of interest can be anticipated in the region for some time to come.

Regarding the magnitude of the expenditure on exploration, development and permanent installations, it will be necessary to lump Pointed Mountain with all activities to date in the natural gas area of the Lower Liard Region. One petroleum company active in the area generously supplied a summary of its investment but requested that it remain unnamed. The information was, however, very valuable in providing a datum which, when supplemented by additional known costs relative to certain wells, permitted a reasonable estimate to be made.







Based on the foregoing it can be estimated that approximately \$50,000,000 have been invested in the Lower Liard Region on some 50 wells which have been drilled during the past few years. From this expenditure seven wells have been recognized as potential producers. Probably one-half that amount could be assigned as the proportion invested in the latter wells.

In 1968 a geological and geophysical program was launched in the area between Great Slave Lake and Camsell Bend by Kenting Aviation Ltd. and some of its associated companies. The program bears the name "operation geoquest" and was devised by A. E. Palister and V. Zay Smith and Assoc. to test certain geophysical methods over an area thought to possess sub-surface geological structures favourable to the accumulation of hydrocarbons. The results are probably to be made available to present holders of exploration permits in the area sometime during the coming year. A part of this area of interest is indicated on companion map 7 and is shown, reservedly, as having hydrocarbon potential.

## INDUSTRIAL MINERALS

### Gravel

Only those gravels located in the vicinity of Fort Liard have received and development, and this has amounted to its limited extraction for use in settlement road surfacing and as an aggregate in cement.



PART 6PARKS & RECREATION LANDSIDENTIFICATION & DISTRIBUTION

These resources are strongly oriented to tourism and involves the preservation of sites considered unique in the region, if not in the N.W.T. The identification of these resources will be combined with a few paragraphs alluding to the distribution of interesting sites in the study region.

National Park Sites

South Nahanni River from  
Nahanni Butte to Glacier  
Lake, including part of the  
Flat River.

Territorial Park Sites

Trout River at Whittaker Falls  
Little Doctor & Cli Lakes  
Trout Lake

NATIONAL PARK SITES

The valley of the South Nahanni River is perhaps the only site which meets the broad objectives of the National & Historic Parks Branch, D.I.A.N.D., as one large enough, and unique enough, for the development of a national park.

If one speaks of the entire basin of the South Nahanni River as a national park site, the area involved amounts to approximately 16,000 square miles. This, however is hardly a practicable consideration. Baker (1963: p. 28) appears to have correctly identified the site as having potential as "a river and canyon park", and this definition should serve as the principal guide in defining the park boundaries.

The major attraction in the valley is Virginia Falls with a height of just over 400 feet and a discharge of water in the early summer months of approximately 60,000 cubic feet per second. This is followed by the extensive canyon development stretching almost from the falls to the "Hot Springs" about 50 miles above Nahanni Butte. Above the falls, Glacier Lake might be chosen as the western termination of the area of interest. The eastern termination should not fall short of the Liard River at Nahanni Butte. (plate 24)

The river distance between Glacier Lake and the latter named settlement is roughly 250 miles, while the distance measured in a straight line would be about 160 miles. The entire distance is described in detail by Baker (1963), as is the surrounding country.



Plate 24 - A composite view of Virginia Falls and The Gate. The latter is located in the third canyon of the South Nahanni River.

#### TERRITORIAL PARK SITES

Only one such site has been noted by the author that fits readily into this particular category, but this does not rule out the possibility that others in the region might not be earmarked as warranting attention as road systems are expanded.



Because the Government of the N.W.T. is just now being organized along lines which will give it considerable autonomy over its own affairs, it is difficult to speculate what scope a parks policy will assume in the future, and to what degree the N.W.T. Government would wish to be involved in the development of park and recreation land. One thing appears necessary, however, and this is that certain reservations on land should be requested from the Federal Government in order to safeguard those sites in which potential can be identified at the present time. Some of those worthy of consideration as Territorial Parks are positioned on companion map 7 and are briefly discussed under their appropriate identities as follows.

### Trout River

This site is bisected by the new extension of the Mackenzie Highway system into Fort Simpson, presently under construction. The site has many interesting phenomena, made the more spectacular because they occur in an otherwise monotonous section of terrain, typical of this part of the Interior Plain.

The most interesting feature of the site is Whittaker Falls with a vertical drop of approximately fifty feet, and located within two-hundred feet of the Highway crossing at Trout River (plate 25). A second waterfall with a vertical drop of roughly 20 feet is located about one mile above the Highway crossing and is known as Coral Falls. Between the respective waterfalls are rapids which reach their best development immediately above Whittaker Falls. Below that, almost to the Mackenzie River is an extensive canyon development.



Plate 25 - View of Whittaker Falls; the rapids immediately above it and the beginning of the canyon development below the falls. Photo looking south.

### Little Doctor & Cli Lakes

The area in which these lakes are situated is one of considerable natural beauty, and the lakes themselves are reputed to afford good fishing. Both lakes cut through the Nahanni Range which, itself, is rather spectacular at this particular location. The lakes are at an elevation between 600 and 700 feet and the Nahanni Range rises abruptly to over 3500 feet. (plate 26)

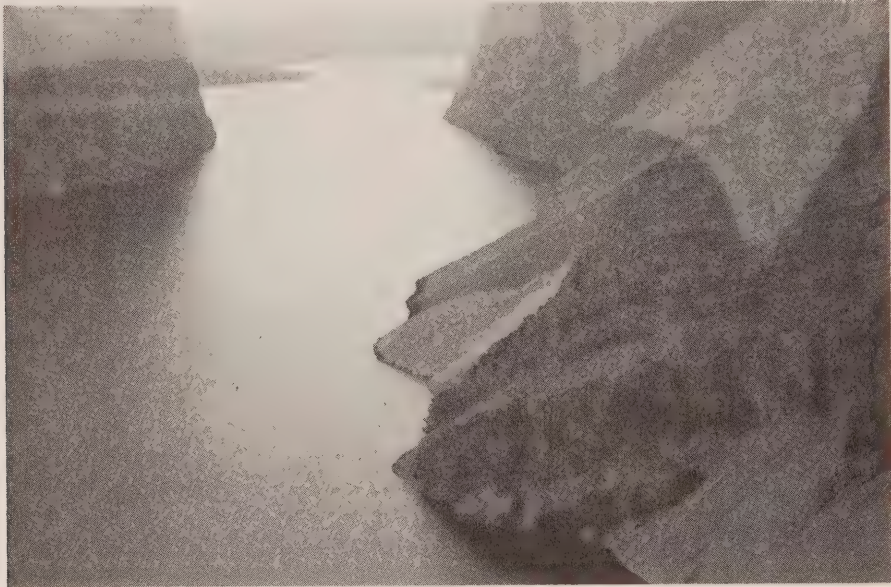


Plate 26 - View looking west through the Nahanni Range at Little Doctor Lake.

### Trout Lake

Trout is the largest lake in the Lower Liard Region and has a fish population of sufficient size to support a sizeable sports-fishing industry, provided the problem of access by surface means can be solved.

Apart from its interest in that regard, the setting of the Lake is attractive and much of its eastern shore consists of wide beaches and forest. The maximum length of the lake is about 35 miles and its maximum width would approximate 15 miles.

### DEVELOPMENT

The process of development where a national park is concerned is naturally a slow one. The South Nahanni River was earmarked as a potential national park some years ago, and, at the present time, the indications are that progress is being made toward developing the site. Additional studies are to be carried out in 1969 to more accurately determine where the park boundaries should be located.



The question of boundaries is perhaps the greatest problem facing the development of the park. Much of the valley of the South Nahanni River must logically be considered to lie in an area of mineral potential, the full extent of which is not yet determined. As has been shown elsewhere in the report, activity pertinent to this resource has increased tremendously in the past few years. Properties like that on Prairie Creek are in well-advanced stages of exploration, and claim-staking in the vicinity has advanced right to the South Nahanni River. Petroleum exploration leases have also been granted in the Lower valley of the south Nahanni River. This development activity must be placed in economic perspective when delineating park boundaries.

Of the sites classed as Territorial Parks, only Trout Lake has been exposed to development of any kind, and this amounts to a sports fishing and hunting camp established a few miles north of the Trout Lake settlement by Mr. Turner of Nahanni Butte, (plate 27). The venture has not proved particularly successful for Mr. Turner.

### SUMMARY

This chapter has attempted to show, in a general way, the natural resource spectrum in the Lower Liard Region. When viewed in relation to the severely contracted resource spectrum of most of the N.W.T., the Lower Liard Region is unique. The proximity of the region to existing and planned transportation routes can only serve to place greater emphasis on the Region's uniqueness in the Territorial setting.

A rudimentary zoning of resources appears in map 7 and the various categories identified in the region appear as follows: fauna, metallic, hydrocarbon and industrial minerals; merchantable forests; arable land; water; park and recreation lands. Most of these categories are further sub-divided in the text of the chapter.

Hydrocarbon resources have reached an advanced stage of over-all development, with the probability of bringing Pointed Mountain gas wells into early production. Five additional wells, located in the Interior Plains in the vicinity of Trout Lake/Fort Liard/Nahanni Butte, are known potential producers and could be placed in production when the circumstances of demand are proper. Exploration for hydrocarbons continues at the present and likely will continue for several years.

Next to hydrocarbons follows the development of the metallic mineral resources. This has proceeded at a much slower pace of development than the former but is, nevertheless, accelerating. The Canada Tungsten Mining Corp. placed a new, efficient mill in production late in 1967, and is engaged in an active program of exploration for new deposits of scheelite. Underground exploration is well advanced on the Prairie Creek property in an effort to prove economic deposits of lead/zinc/silver, and renewed exploration is taking place on the properties of Redstone Mines Ltd. in connection with lead/zinc/silver/copper mineralization near Dal and Plateau Lakes.

The fauna resources, although halfway through their second century of exploitation, are only moderately well-developed, but doubts must be expressed regarding a significant improvement in the development of this resource.

The balance of the resources, i. e., merchantable forests, arable land, water, and parks and recreation lands have received no development worth mention in the summary. These are large and important land-based resources which likely will pave the way for meaningful economic growth in the future.



Plate 27 - A composite view of the Trout Lake sports fishing camp. The upper part shows a shoreward view of the buildings and the extensive beach development along the shore-line. The bottom view is of one of the guest cabins.



## CHAPTER 6

### CURRENT ECONOMIC ACTIVITIES

#### IN THE PERMANENT CENTRES

##### INTRODUCTION

The Lower Liard Region can correctly be viewed today as a region possessing within its boundaries several widely separated pockets of economic activity, some of which might properly be classed as micro-economies, and none of which is truly dependent on the others for its economic survival.

As an illustration of this circumstance it could in all truth be said that if for some reason the non-permanent centres were suddenly to cease all activities in the Lower Liard Region, the effect would be of slight, or of no economic consequence at all to the permanent centres at the present time. Just the opposite would be equally true because the non-permanent centres are in no-wise dependent on the permanent centres. To carry the illustration even further; the reliance of any permanent centre upon another of like kind is such that the phasing-out of one or more of them would cause little or no economic upset to the remainder.

The region lacks developed infra-structures, particularly of transport and other services and, for this reason perhaps more than any other, the regional economy might properly be called amorphous. In these circumstances there is no rational way in which the existing economy can be examined on a regional basis and it becomes necessary, therefore, to look at the several pockets of economic activity separately.

The diagram, fig. 2, was introduced in a previous chapter to help identify the different populations and the centres which they inhabit. The diagram will have useful application in discussion economic activity in the study region and will be useful also in explaining some of the broader aspects of this activity in the introductory part of the present chapter.

The five permanent centres identified in the region are entrenched in the traditional economy typical of much of the north. During the last decade, at least, few will question that the traditional economy has of necessity come to mean a "Government supported economy supplemented by trapping". The removal of Government support would unquestionably bring about immediate economic collapse of the permanent centres, so vital has the Government support become.

The present chapter deals, wherever possible, mainly with income and its distribution. It makes an attempt also to arrive at an acceptable estimate of the magnitude of capital investment. Other activities of economic interest

such as fuel and power consumption, certain aspects of the labour force, etc. are dealt with in respectable detail within the limitations of money and time prescribed for the completion of the report. Some limitations and introductory details regarding the subject matter are discussed briefly in the following paragraphs.

### Capital Investment

From the author's point of view the establishment of investment levels, however general, is essential to any economic examination; although this aspect has rarely if ever been stressed in previous reports of this kind. This, no doubt, was because of the difficulties of arriving at rational levels in the sometimes peculiar circumstances encountered in northern areas with regard to the value of assets of various kinds.

The level of Government investment arrived at by the survey is based principally on the values assigned in various capital accounts respecting certain of the installations. Some values had been adjusted for depreciation while others had not. It was necessary also to incorporate values estimated by informed Government personnel because original costs were not readily available. Other values, still, were estimated by the author on the basis of a physical comparison with similar installations for which a value had been obtained from either of the preceding two sources.

Private investment was approached in much the same way. Many companies were most cooperative in supplying current book values relative to investment in assets and this provided a useful datum for estimating. The value of private dwellings is mostly estimated, but certain use was made of the N. W. T. assessment and tax roll in arriving at investment levels for Fort Simpson. Finally, the tables on investment levels are intended to illustrate relative magnitudes for the permanent centres but, by and large, should be considered conservative in the amounts assigned. For those who feel "replacement cost" to be a more accurate indicator of investment, then the amounts shown later in all investment categories for the permanent centres could safely be doubled, and in some instances trebled.

### Disparities Within the Region

Tangible incomes in the permanent centres are much below the per capita averages struck for even the most economically depressed Provinces of the Atlantic Seaboard, but may be somewhat higher than the incomes of Indian and Metis peoples in some other northern settlements. As indicated in an earlier chapter, those particular ethnic groups are rather firmly-rooted in the communities and are unlikely to show early signs of improving their present, low labour-mobility, even in the face of considerable financial and physical hardship.



Set apart geographically and economically from the permanent centres are development sites which are the modern extensions of southern economies, however isolated they may be. A twofold division of non-permanent centres was noted in fig. 2. These centres are dependent to a very high degree on southern economies for their immediate survival, and on continental and world markets for their long-term prospects.

Direct comparisons between the non-permanent and permanent centres are hardly valid in the circumstances that prevail in the region, but some of the more obvious differences are: in the former centres, the bulk of capital investment is directed toward the development of primary resource-based industry and is not expended as social investment as is the case in the permanent centres; the total labour force is employed and, moreover, at income levels equivalent to or better than the national average; administrative, management and servicing requirements are executed much more efficiently than in the permanent centres.

Differences do not, of course, end with the foregoing but could be extended to the field of education generally, cultural background, development policy, quality of the labour force and a host of other factors which in some way contribute toward economic disparities within the region. All of these circumstances have been recognized by the authorities long ago and it is hoped that development programs which will be required in the immediate future will give substantial priority to developing those resources from which labour-intensive industries might arise locally.

### Estimates

If studies of this particular kind had to predicate their presentation of numerical data solely on fully documented and otherwise reliable information, very little of value would emerge because seldom are such ideal conditions met with. Considerable estimating is always necessary and it remains only to indicate where in the compilations the estimating has been resorted to. Such instances are identified in the text by (E) - totally estimated, or alternatively, (E - 10%) partially estimated to the extent shown as a percentage.

### Labour Force

The labour force, as discussed in relation to the permanent centres, is about the most critical aggravation to the present and future economy within each of those particular centres. In the report this subject is discussed mainly in terms of the Indian and Metis populations in respect of whom it is the most pressing problem. Primarily, the labour force is spoken of in the text in numbers of males and females in the age group 16-65 years, with a further reduction to man-day values. Utilization of the labour force could only be considered where involvement concerned wage-labour and/or salaried positions. It would, for example, be impossible to ascertain the number of man-days expended in a pursuit as undisciplined as trapping, in the time available for field work.

In general, the utilization of the labour force was arrived at by a division of the total sums dispersed on wage-labour by the prevailing hourly rates paid by the several Government and private agencies. Where possible, man-days expended in respect of permanent positions were isolated from casual or part-time positions. In this regard, however, it seemed more important from the author's viewpoint to show the relationship between the total available labour-force and its utilization, rather than to dwell on how many individuals filled how many and what positions. The ratio between availability and utilization would seem to be the critical indicator in this particular sphere of economic activity.

### Other Limitations

The centre of Fort Simpson was earlier deemed to be beyond or on the fringe of the Lower Liard Region and, according to the terms of reference, was to be dealt with only if time and funds permitted. For this reason the economic data concerning that centre, although more voluminous because of the size of the centre, are lacking in certain time-consuming details included for the remaining permanent centres more properly located within the study region.

A further reason which inhibited the gathering and presentation, more particularly of financial information relative to private businesses and incomes of the White community, was the reluctance on the part of businesses and individuals to provide it to the survey. Some of the parties volunteered the information while others would not. It was decided, therefore, that in fairness to all that unless these particular data could be obtained complete, they would not be presented in detail. Financial details of private business activities and individual incomes are not therefore included for Fort Simpson.

For roughly the same reasons, and for other reasons explained later, only specific aspects of the labour force in the non-permanent centres are discussed. In this connection it should be recognized that detail is not nearly so important in these particular centres because their entire presence, purpose and economic viability are vastly different from the permanent centres which, together, are the real seat of depression and immediate concern in the region.

## PERMANENT CENTRES

### FORT LIARD

#### CAPITAL INVESTMENT

It is of little import to this study to discuss the distribution of capital investment over the range of Government Departments and Agencies that may have interests in the settlements, these are, therefore, simply grouped and a sum is applied to the general categories of installations, fixtures and furniture, and equipment. Those departments and agencies represented in Fort Liard are: D. I. A. N. D. , D. N. H. W. and the R. C. M. P.



TABLE 33CAPITAL INVESTMENT - FORT LIARDGovernment

| <u>Installations</u>  | <u>Fixtures/Furniture</u> | <u>Equipment</u>  |
|---|---------------------------|-------------------|
| \$ 298,000 (E-42%)  | \$ 43,000 (E-80%)         | \$ 73,000 (E-27%) |
| Data Sources: D.I.A.N.D., D.N.H.W., R.C.M.P., and estimates |                           |                   |

Institutions  
(R.C. Mission)

|                              |            |           |
|------------------------------|------------|-----------|
| 60,000 (E)                   | 25,000 (E) | 3,000 (E) |
| Data Sources: Estimates only |            |           |

Commercial  
(H.B. Co.)

|                              |            |           |
|------------------------------|------------|-----------|
| 90,000 (E)                   | 30,000 (E) | 5,000 (E) |
| Data Sources: Estimates only |            |           |

Private

|                              |  |       |
|------------------------------|--|-------|
| 160,000                      |  | 5,000 |
| Data Sources: Estimates only |  |       |

NOTE: Under "private" is included all privately-owned buildings with due regard to condition; the land owned by residents, and vehicular and other equipment owned by residents.

|            |           |           |
|------------|-----------|-----------|
| \$ 608,000 | \$ 98,000 | \$ 86,000 |
|------------|-----------|-----------|

Total Capital Investment in the settlement of Fort Liard      \$792,000      +

LABOUR FORCEPotential Labour Force

The potential labour force is presumed to include both sexes in the range 16-65 years of age. On the strength of the structural diagram, fig. 3, this force at Fort Liard amounts to: 71 males and 42 females; or 49% of the combined Indian/Metis population. (Indian 219 - Metis 11). Based on 245 working days per calendar year, the potential of the force equals 27,685 man-days.

Utilization of the Labour Force 1967/68

A total of approximately 1,511 man-days were expended in wage-labour pursuits during the fiscal year 1967/68. The resultant distribution of man-days over established categories of labour was:

|                 | <u>Permanent</u> | <u>Part-Time</u> | <u>Casual</u> |
|-----------------|------------------|------------------|---------------|
| <u>Man-days</u> | 580              | 167              | 764           |

In terms of utilization of the potential labour force at Fort Liard during the period of interest, only 5.5% of the man-hours available found an outlet in wage labour pursuits. The balance of the potential was devoted to fauna harvesting and unidentified interests.

### Labour Force Projection to 1979

By the end of 1978 the labour force at Fort Liard will likely total about 161 individuals, after having made due allowance for those entering into and passing from the 16-65 years age group. The potential of this force at that time will probably have risen to about 39,445 man-days per year, an increase of nearly 30% over present potential.

### HOUSEHOLD INCOME

The table depicting household income is an attempt to illustrate the total income devolving upon the households of permanent residents in Fort Liard during the fiscal year 1967/68 (1 April - 31 March). Social Assistance, although received in kind, is properly considered as part of income and for convenience its cash equivalent is shown.

The value of country food as a part of household income is necessarily excluded from the table because the task of accumulating reliable data would be beyond the time available for this study. The Northwest Territories To-Day (1965: p. 53) estimates the per capita consumption of country food in the N.W.T. at \$200 - \$300 per annum but the basis of the estimate is not explained.

TABLE 34

#### DISTRIBUTION OF INCOME BY HOUSEHOLD - FORT LIARD

| House-<br>hold | Occu-<br>pants | Wage<br>Gov. | Labour<br>Priv. | Trap-<br>ping | Handi-<br>crafts | Soc.<br>Legis. | Soc.<br>Ass. | Other | To  |
|----------------|----------------|--------------|-----------------|---------------|------------------|----------------|--------------|-------|-----|
| 1              | 3              | 714          |                 | 1115          |                  | 900            | 130          |       | 285 |
| 2              | 4              | 199          | 75              | 12            | 6                |                | 114          |       | 40  |
| 3              | 8              |              | 229             | 988           | 12               | 240            | 35           |       | 150 |
| 4              | 9              |              | 194             | 785           |                  | 576            | 175          |       | 173 |
| 5              | 9              | 25           | 41              | 1170          | 6                | 408            | 260          |       | 191 |
| 6              | 3              | 56           |                 | 762           |                  |                |              |       | 83  |
| 7              | 1              |              |                 |               |                  | 1308           |              |       | 130 |
| 9              | 11             | 6618         | 100             | 147           | 10               | 480            | 93           |       | 744 |
| 10             | 6              | 135          |                 | 410           |                  | 1524           | 10           |       | 207 |
| 11             | 10             |              |                 | 424           |                  | 552            | 300          |       | 127 |
| 12             | 8              |              |                 | 684           |                  | 456            |              |       | 114 |
| 13             | 1              |              | 3270            |               |                  |                |              |       | 327 |
| 14             | 3              | 258          |                 | 410           | 40               | 72             | 75           |       | 83  |

|     |    |      |      |      |                       |      |      |      |
|-----|----|------|------|------|-----------------------|------|------|------|
| 15  | 5  | 178  | 11   | 1241 |                       | 144  |      | 1574 |
| 16  | 4  |      |      | 434  |                       | 1380 |      | 1840 |
| 17  | 2  | 273  | 75   | 494  | 2                     |      | 30   | 874  |
| 19  | 1  |      |      | 65   | incomplete data ----- |      |      | 65   |
| 20  | 4  | 1298 | 255  | 18   |                       |      |      | 1571 |
| 21  | 8  | 4492 |      |      |                       | 408  |      | 4900 |
| 22  | 6  | 164  | 84   | 526  | 22                    | 258  | 90   | 1144 |
| 23  | 7  | 322  | 144  | 504  |                       | 360  | 145  | 1475 |
| 26  | 4  | 127  | 171  | 535  |                       | 96   | 60   | 989  |
| 27  | 3  |      |      | 2239 |                       |      | 360  | 2599 |
| 28  | 9  | 341  | 96   | 85   | 1                     | 296  | 1450 | 2869 |
| 29  | 2  | 35   | 75   | 4    | incomplete data       |      | 70   | 184  |
| 30  | 3  | 185  |      | 264  |                       | 168  | 150  | 767  |
| 32  | 4  | 188  | 565  | 481  |                       | 168  |      | 1402 |
| 33  | 10 | 966  |      | 259  |                       | 456  | 135  | 1816 |
| 34  | 11 | 330  | 1064 | 249  |                       | 648  | 240  | 2531 |
| 35  | 7  | 760  | 204  | 254  | 1                     | 300  | 170  | 1689 |
| 37  | 7  | 188  |      | 405  |                       | 1628 |      | 2221 |
| 38  | 8  | 56   | 120  | 631  | 1                     | 132  | 10   | 950  |
| 39  | 6  | 210  | 10   | 531  | 8                     | 294  | 125  | 1178 |
| 40  | 2  | 584  | 72   | 272  | 6                     | 980  | 175  | 2089 |
| 41  | 6  | 256  | 80   | 196  | 9                     | 216  | 105  | 862  |
| 42  | 3  |      |      | 183  |                       | 1396 |      | 1579 |
| 43  | 1  |      |      | 561  | 19                    |      |      | 580  |
| T1  | 4  | 202  |      | 547  |                       | 144  | 90   | 983  |
| T2  | 1  |      |      | 136  |                       | 1308 |      | 1444 |
| T3  | 6  | 31   | 27   | 844  | 7                     | 274  | 75   | 1258 |
| T4  | 5  | 101  |      | 446  |                       | 144  | 60   | 751  |
| T5  | 1  |      |      | 391  |                       | 900  |      | 1291 |
| T6  | 1  |      |      |      |                       | 1308 |      | 1308 |
| T7  | 3  | 64   |      | 288  |                       | 72   |      | 424  |
| T8  | 4  |      |      | 658  |                       | 144  |      | 802  |
| T9  | 3  | 346  | 57   | 179  | 29                    | 66   |      | 677  |
| T10 | 2  |      |      | 6    |                       | 1308 | 315  | 1629 |
| T11 | 1  | 209  |      | 610  |                       |      |      | 819  |

---

|           |          |       |        |     |        |       |     |        |
|-----------|----------|-------|--------|-----|--------|-------|-----|--------|
| Sub Total | \$19,911 | 7,019 | 21,443 | 205 | 21,512 | 5,047 | 600 | 75,737 |
|-----------|----------|-------|--------|-----|--------|-------|-----|--------|

---

|                      |               |
|----------------------|---------------|
| Undistributed Income | 900 (E - 44%) |
|----------------------|---------------|

---

|       |          |       |        |       |        |       |     |        |
|-------|----------|-------|--------|-------|--------|-------|-----|--------|
| Total | \$19,911 | 7,019 | 21,443 | 1,105 | 21,512 | 5,047 | 600 | 76,637 |
|-------|----------|-------|--------|-------|--------|-------|-----|--------|

---

Data Sources: D.I.A.N.D., H.B. Co. fur-returns and miscellaneous accounts

NOTE: - The discontinuities in household numerical identification is explained by the unoccupied housing shown in table 17.

- Those households identified with a "T" prefix indicate tent accommodation, which was unaccounted for in table 17.
- Social Legislation includes: old age security, guaranteed income supplement, old age assistance, disabled persons allowances of all kinds, and family allowances.

The relative importance of the several sources as depicted in the table was as follows:

| Sources                  | Households Affected | Source Contribution in<br>Percent of Total Income |
|--------------------------|---------------------|---|
| Wage Labour              | 35                  | 32.2  |
| Social Legislation       | 38                  | 28  |
| Trapping                 | 44                  | 28  |
| Social Assistance        | 28                  | 6.6   |
| Handicrafts              | 16+                 | 1.4   |
| Other (R.C.M.P. Pension) | 1                   | .8  |

This comparison of the sources of household income serves to demonstrate the declining importance of trapping to the permanent communities. In this connection it should be remembered that, of all the permanent population centres in the Lower Liard Region, Fort Liard has remained the one centre most inclined toward trapping as its principal pursuit. It consumes a large part of the expended man-days in any given year; even though the income derived from it may be substantially less than is derived from other sources requiring less individual effort.

The field data disclose a general pattern of income flow in the year. For example, wage labour opportunity, except in the cases of the permanently or part-time employed, does not conflict with that time of year, November-April, when trapping is in full-swing. The bulk of social assistance corresponds almost exactly to the period of maximum wage-labour opportunity; namely, May-October, when the entire population is residing in the settlement. Income derived from social legislation naturally arrives in nearly equal amounts during each month of the year.

Although the table cannot claim complete accuracy in its presentation of financial data, these are sufficiently accurate to illustrate that broad averages struck in relation to population and income are often not indicative of the real situation in income levels. That kind of broad averaging applied to Fort Liard shows, for example, that the average income per household was roughly \$1,596 while the per capita income was approximately \$333. What it fails to show is that 37.5% of all households receive less than \$1,000 per annum, and that 58 individuals were so affected; e. g.,



| <u>Income Group</u> | <u>Households Affected</u> | <u>Persons</u> |
|---------------------|----------------------------|----------------|
| \$ 499 or less      | 4                          | 10             |
| 500 - 999           | 14                         | 48             |
| 1000 - 1999         | 21                         | 112            |
| 2000 - 2999         | 7                          | 41             |
| Over 3000           | 2                          | 19             |

However, when considering income in northern communities of this kind it is well to remember the intangible benefits to which it is difficult to assign a monetary value. For example, the native community obtains a large part of its fresh meat requirements from the surrounding country which is often shared within family groups; with few exceptions the natives own their houses, and, for those owning land, the taxes are non-existent or negligible; fuel is obtained from the forests and medical attention is free.

The mention of these factors is not intended to justify the poor financial status of many households in the community, but rather to achieve fairness in the presentation of income data. Regardless of these "extras" the per capita incomes remain far below those averages prevailing in the Atlantic Provinces, and it is the more unfortunate that this should be the circumstance in that part of the Lower Liard Region which possesses great latent wealth in natural resources.

### INCOME OF FLOATING POPULATION

The cash income attributable to the White floating element at Fort Liard during the 1967/68 fiscal year was estimated to be approximately \$30,000. It would be difficult to determine what proportion of this sum would be re-circulated in the local economy, but it was likely small and would normally be limited to lesser purchases at the H.B. Co. store.

The R.C.M.P. and D.I.A.N.D., for example, either provide rations for their staffs or make some provision for their procuring same in the south. This means of course that these procurements by-pass the local H.B. Co. store which, presumably, would require less local staff to deal with the remaining counter-sales of foodstuffs and other merchandise.

### SOURCES OF INCOME

These are discussed briefly in relation to the permanent population.

#### Wage Labour

Wage labour opportunity has normally emanated from two sources, i.e., Government and private. It is obvious that the Government has been the

major contributor in this category; mainly through its public works programs in this and other such communities. The projects usually include road improvements, brushing, and miscellaneous undertakings to generally improve a settlement. The object of hiring is to provide as many individuals as possible with some amount of casual employment.

Three natives are permanently employed by the D.I.A.N.D. and cover the positions of fire-ranger, janitor and garbage collection. (the latter is by contract) Two others are part-time employed in janitorial and fire-tower duties. Roughly 52 others were employed on a casual basis by the D.I.A.N.D. in the fiscal period 1967/68.

The H.B. Co. is the only locally-based private concern offering permanent employment, and this it does to the extent of one full-time store-clerk. The store manager also provides occasional employment around the staff-house for one or two domestics.

Other private concerns who contributed to local income through their casual employment of Fort Liard residents in the 1967/68 fiscal year were: R.J. Keen Construction Ltd., sub-contractors to Pan American Petroleum Corp., who employed four Indians on road construction, and James Millar and Associates who employed approximately 24 Indians in the archaeological diggings at nearby Fisherman Lake. In addition, a few received casual employment at the Pan-Am barge unloading area a few miles above Fort Liard. No information was available regarding this latter employment, but it was not judged large by local informants.

### Trapping

This is undeniably the most time-consuming source of income for the permanent population of the centre. Some 61 individuals traded furs during the fiscal period, but only four households derived incomes in excess of \$1,000 from trapping.

As a point of interest, about 55% of all income derived from trapping by the Fort Liard Indians resulted from harvesting in areas outside the N.W.T. The 1967/68 Harvest was apportioned as follows: British Columbia 43.1%; Yukon 11.8%; and N.W.T. 45.1%.

The trapper can dispose of his furs in two ways, the first of which is by trading at the H.B.Co. store where the value received may be used to retire, or help retire, a debit balance in his account or to establish a credit balance. Alternatively, if his account is in good shape, he may elect to take cash. The second method is through a facility offered by the Game Branch which was outlined in a foot-note in Part 1 of Chapter 5.

The latter method offers maximum returns ultimately for the trapper but is cumbersome, and, moreover, is objectionable to the merchant-traders for reasons which should be clear. To deal with the latter comment first; the trader loses control of the situation because the time-old method of off-setting debit balances in individual accounts is placed in jeopardy, and further, he is deprived of the profit normally realized through the sale of his fur inventory to the extent the inventory is reduced as a result of direct sale of furs to the auction houses by the trappers.

The method is also cumbersome to the trapper for a number of reasons, e.g., he is unlikely to find the trader enthusiastically disposed toward grubstaking in such circumstances; he cannot receive the initial partial-payment for his harvest in cash; he has a long wait for the final payment in cash, and, last but not least, he may suffer from a downward fluctuation in fur prices by the time the auction is held.

The plan does not appear to be particularly adaptable to the circumstances of life in the smaller settlements; particularly as they relate to the indispensable role of credit in the economy. The mere introduction of a "cash basis" by a trader-merchant would be sufficient to bring about a virtual economic collapse in settlements such as Fort Liard. If nothing more, this should point-up the need to carry considerations beyond simply the trapper when devising such plans, even though the intent to improve his lot is very commendable.

There appears no doubt that in the long run the trapper might benefit significantly from a workable plan which would bring his harvest directly to the auction house rather than through the local trader, (table 35), but a good deal of caution seems indicated in the formulation of plans such as this to avoid seriously upsetting the equilibrium that does exist in the local economy.

TABLE 35

AVERAGE AUCTION & TRADER PRICES - RAW FURS

| Year    | Beaver | Lynx  | Marten | Mink  | Muskrat | Squirrel |
|---------|--------|-------|--------|-------|---------|----------|
| 1962/63 | 12.87  | 9.95  | 8.06   | 20.36 | 0.74    | 0.31     |
|         | 14.21  | 18.21 | 14.40  | 24.81 | 1.55    | 0.58     |
| 1963/64 | 14.20  | 13.46 | 10.11  | 22.86 | 1.03    | 0.44     |
|         | 13.32  | 16.10 | 15.78  | 28.33 | 1.22    | 0.88     |
| 1964/65 | 11.22  | 12.98 | 9.56   | 17.79 | 0.96    | 0.43     |
|         | 12.67  | 15.78 | 15.12  | 14.72 | 1.14    | 0.65     |
| 1965/66 | 11.31  | 22.52 | 13.42  | 16.18 | 0.95    | 0.41     |
|         | 14.32  | 43.45 | 15.87  | 16.68 | 1.46    | 0.69     |
| 1966/67 | 9.97   | 26.68 | 12.49  | 13.49 | 0.54    | 0.43     |
|         | 13.12  | 28.65 | 14.86  | 17.23 | 0.80    | 0.64     |

Data Sources: DIAND, Edmonton Fur Auction Sales, Edmonton, Alberta.



NOTES: -The prices appearing opposite the year-identity were those paid the trapper by the H. B. Co. at Fort Simpson, while those appearing immediately below represent the average values that could have been received, less commission, by the trapper had he dealt directly with the auction house. Auction house averages were not available for furs received from Fort Liard trappers.

### Other

It would seem not necessary to expand on sources such as social legislation and assistance, but handicrafts might require some explanation. Handicrafts is not a particularly well-developed source of income as evidenced by the very small amount applied to it in table 34. Attempts have been made in past years to improve production in the settlement but none has so far met with the kind of success desired by the authorities.

The undistributed amount of \$900 appearing in the aforementioned table with respect to handicrafts represents \$500 worth of purchases by D.I.A.N.D. at Fort Simpson, and an estimated \$400 worth in sales to private parties. Much of the income derived from handicrafts was thought to devolve upon one family in Fort Liard which specializes in work of birch-bark. Some of the products by others in the community are rather inferior in quality and workmanship and are not apt to be in great demand.

### OTHER ASPECTS OF THE ECONOMY

Under this heading is included a number of additional factors which play a part in the economy of the settlement.

#### Cost of Freight

With a minor exception, all goods consigned to Fort Liard arrive by barge from Fort Nelson, B.C. The minor exception referred to concerns occasional small shipments of perishables by air to the H.B. Co. store. The principal point of origin for merchandise is Edmonton, and goods are trucked to Fort Nelson for trans-shipment by river-barge. The approximate truck rate is \$2.50 per cwt., and the barge rate about \$1.50 per cwt. The effective price increase on goods at Fort Liard as a result of freight charges is, therefore, about \$0.04 per pound. If the proposed highway extension from Fort Liard to Fort Nelson materializes, then the minimum rate might be expected to equal that prevailing between Edmonton and Hay River, approximately \$2.50 per cwt for full loads.

The present cost of bulk-oil shipments from the depot at Fort Nelson is 12.45 cents per gallon.



### Consumption of Fuel Oil

Fuel oil is used only by the Government agencies, the H.B. Co., and to a limited extent by the Catholic Mission. Heating and cooking in the native houses is achieved through the use of wood-burning stoves. The approximate consumption of fuel-oil in the settlement during the 1967/68 fiscal year was as summarized in the following table.

TABLE 36

CONSUMPTION OF FUEL-OIL - FORT LIARD - 1967/68  
(gallons)

| Agency<br>&<br>Month | R.C.M.P. | H.B. Co. | D.N.H.W. | School | Forest<br>Service | Garage | Power<br>House | Total  |
|----------------------|----------|----------|----------|--------|-------------------|--------|----------------|--------|
| April                | 400      |          |          | 250    | 300               |        | (E) 1300       | 2250   |
| May                  |          | 395      |          |        |                   |        | (E) 1200       | 1595   |
| June                 |          |          |          | 100    |                   |        | (E) 1000       | 1100   |
| July                 |          |          | 350      |        |                   |        | (E) 900        | 1250   |
| August               | 175      | 300      |          |        |                   |        | (E) 900        | 1375   |
| Sept.                | 270      |          |          | 160    | 188               |        | (E) 1200       | 1818   |
| October              |          | 405      | 287      | 320    | 348               |        | (E) 1250       | 2610   |
| November             | 450      | 229      | 300      |        |                   |        | (E) 1300       | 2279   |
| December             | 440      | 522      | 288      | 178    | 190               | 100    | 1340           | 3058   |
| January              | 721      | 564      | 326      | 910    | 292               | 268    | 1614           | 4695   |
| February             | 420      | 408      | 310      | 458    | 280               | 166    | 1290           | 3332   |
| March                | 150      | 204      |          | 393    | 242               | 50     | 1314           | 2353   |
| Totals               | 3026     | 3027     | 1861     | 2769   | 1840              | 584    | 14,608         | 27,715 |

Data Sources: D.I.A.N.D. records, and, (E) -estimates supplied by power-plant operator.

Reliable estimates on wood-fuel consumption for the native dwellings could not be obtained. However, the main building of the Catholic Mission places its annual consumption of wood at 15 single cords through the winter. It is reasonable to assume that the average native dwelling might, therefore, require some 8 single cords. Omitting the tent dwellings from the table of households, because they are not present in the settlement during the winter, 36 native dwellings are left. Based on the foregoing, these probably consume in the neighbourhood of 300 single cords each year.

### Consumption of Power

Incomplete records made impossible the extraction of data pertinent to the total power consumption in the settlement. An approximation for the stated fiscal period can, however, be arrived at by using a formula allowing 10 KWH per

gallon of fuel oil consumed, less 10% for line loss. Based on this formula, power consumption for the year may be placed at roughly 131,500 KWH.

Power rates in the settlement, which are uniform for all permanent population centres except Fort Simpson, are \$0.12 per KWH. This extraordinarily high unit-cost for power is a source of contention in many communities.

### Commercial Establishments

It is probably a near-truth that virtually the total tangible income of the permanent population of Fort Liard would pass to the H.B. Co. store in the settlement. One exception would be the amount dispersed on mail-orders via the mails. The net amount spent in this way during the 1967/68 fiscal year was \$2856, according to the post-office records. Possibly another exception would be disbursements made outside the settlement during visits and the like, but these are likely negligible, due to the limited amount of travel of that kind.

The average monthly extension of credit by the H.B. Co. store amounts to approximately \$5500. The credit extension to individual households ranges between \$15 - \$200. Credit is normally extended on the basis of an individual's performance as a trapper, and, if a non-trapper, solely on his performance with regard to previous indebtedness.

In the estimation of the store manager, it costs the average permanent household about \$3500 per year to live if it bases itself in the settlement the whole year, and about \$2000 per year if based in the bush for the trapping season where better advantage may be taken of the country food source. It seems obvious that it must cost substantially less than is indicated by these estimates or, alternatively, most households must be mortgaged to the store for many years to cover the cost.

### NAHANNI BUTTE

#### LABOUR FORCE

##### Potential Labour Force

Nahanni Butte has a potential labour force consisting of 17 males and 15 females in the age range 16 - 65 years. Using the formula established for Fort Liard, this labour force may be said to have a potential of 7,840 man days.

##### Utilization of the Labour Force 1967/68

Utilization of the labour force in the settlement amounted to 1158 man days, or about 14.7% of its real potential during the year specified. The distribution over wage-labour categories was as follows:

|                 | <u>Permanent</u> | <u>Casual</u> | <u>Total</u> |
|-----------------|------------------|---------------|--------------|
| <u>man days</u> | 245              | 913           | 1158         |

Labour Force Projection to 1979

Based on the existing population, the labour force will increase by 15 individuals by the end of 1978 and will decrease by five individuals over the same period. The net labour force will, therefore, consist of 42 individuals with a potential of 10,290 man-days, or an increase of nearly 24% over its present potential.

TABLE 37CAPITAL INVESTMENT - NAHANNI BUTTEGovernment

| <u>Installations</u>                    | <u>Fixtures/Furniture</u> | <u>Equipment</u> |
|---|---------------------------|------------------|
| \$ 65,000 (E-3%)                        | 5,000 (E)                 | 10,000           |
| Data Sources: D.I.A.N.D., and estimates |                           |                  |

Institutions (R.C. Mission & Pentacostal Alliance)

|                        |           |
|------------------------|-----------|
| 24,000 (E)             | 5,000 (E) |
| Data Source: Estimates |           |

Commercial (A.G. Turner Store, etc.)

|                        |           |                    |
|------------------------|-----------|--------------------|
| 18,000 (E)             | 5,000 (E) | 25,000 (E)         |
| Data Source: Estimates |           | (aircraft & barge) |

Private

|                        |           |           |
|------------------------|-----------|-----------|
| 48,000 (E)             | 4,000 (E) | 7,000 (E) |
| Data Source: Estimates |           |           |

|            |        |        |
|------------|--------|--------|
| \$ 155,000 | 18,000 | 42,000 |
|------------|--------|--------|

Total Capital Investment in the Settlement of Hahanni Butte215,000 +HOUSEHOLD INCOME

Wherever the permanent population centres are dealt with in this chapter, the qualifications expressed in the section on Fort Liard will have general application, unless otherwise stated.



TABLE 38

## DISTRIBUTION OF INCOME BY HOUSEHOLD - NAHANNI BUTTE

| House-<br>hold       | Occu-<br>pants | Wage Gov. | Labour<br>Priv. | Trap-<br>ping | Handi-<br>crafts | Soc.<br>Legis. | Soc.<br>Ass. | Total  |
|----------------------|----------------|-----------|-----------------|---------------|------------------|----------------|--------------|--------|
| 2                    | 2              | 415       |                 | 318           |                  |                |              | 733    |
| 3                    | 10             | 1771      |                 | 478           |                  | 558            | 120          | 2927   |
| 4                    | 6              | 920       |                 | 325           |                  | 282            | 362          | 1889   |
| 5                    | 15             | 3003      |                 | 1949          |                  | 632            | 126          | 5710   |
| 6                    | 11             | 2784      |                 | 1418          |                  | 384            | 200          | 4786   |
| 7                    | 5              | 147       |                 | 862           |                  | 1980           | 29           | 3018   |
| 8                    | 5              | 465       |                 | 506           |                  | 216            | 25           | 1212   |
| 9                    | 4              | 724       |                 | 883           |                  | 96             | 31           | 1734   |
| 10                   | 1              | 403       |                 | 543           |                  |                |              | 946    |
| 11                   | 2              | 5892      |                 |               |                  | 24             |              | 5916   |
| S. Total             |                | 16,524    |                 | 7,282         |                  | 4,172          | 893          | 28,871 |
| Undistributed Income |                |           |                 | 4000 (E)      |                  | 1174           |              |        |
| Totals               |                | 16,524    | 4,000           | 7,282         | 1,714            | 4,172          | 893          | 34,045 |

Data Source: D. I. A. N. D. , Fort Simpson, A. G. Turner, Nahanni Butte, and estimates.

The above table treats only the native segment of the permanent population, and broad averages based on this population show that the average household income was \$3404 and the per capita income approximately \$558 for the fiscal year 1967/68.

This presents a picture infinitely more attractive than the one established by the averages pertinent to Fort Liard. However, it would be misleading to end with this observation because the particular fiscal year being examined was an unusual one for Nahanni Butte, featuring a wide departure from the norm regarding public works projects and therefore income.

At Nahanni Butte a public works project of road construction connecting the settlement with the landing-strip accounted for \$10,695 of income shown in the table under "Government wage-labour". Normally, public works projects in the community would contribute between \$2,000 and \$3,000 to income. For the fiscal year 1968/69, for example, the allotment was \$2,800. If we use the latter figure to adjust for the approximate norm, the per capita income would have been only slightly higher than at Fort Liard, but the average household income would be nearly double that established at Fort Liard because of the greater density of persons per household at Nahanni Butte.



## SOURCES OF INCOME

### Wage Labour

The source of wage-labour is mainly Government and the circumstances are similar to those that obtained at Fort Liard with respect to the casually employed. The D. I. A. N. D. had one prevailing rate or permanent employee in the settlement. This individual covered the positions of power-plant operator and school janitor.

The amount of \$4,000 shown under "private wage-labour" was earned by certain members of the native population for guiding services. About half the amount was paid-out by Nahanni Outfitters and the remainder by an outfitter located outside of the Lower Liard Region. The amounts could not be assigned to specific households. The trading establishment does not employ natives as clerks because the comparatively small turn-over does not warrant it.

### Trapping

Twenty members of the native population traded furs during the fiscal year of interest. The average return per trapper at Nahanni Butte was \$364, which corresponds nearly exactly with the return per trapper at Fort Liard.

The trappers of Nahanni Butte, unlike those of Fort Liard, are settlement-based. Trapping forays of up to several days are made from the settlement to the traplines, contained generally within the southerly of the two harvesting areas depicted in map 8.

### Handicrafts

Approximately \$175 of the amount assigned to income from handicrafts was derived from purchases by D. I. A. N. D. at Fort Simpson. About \$500 worth of these products were purchased by the local trader, and the balance was accounted for through private sales.

The industry is not highly developed in the settlement, and the same might safely be said for the entire region. The handicrafts produced by the natives of Nahanni Butte appear, however, to be of quite good quality and perhaps deserve rather more attention than they have attracted in the past.

## OTHER ASPECTS OF THE ECONOMY

Goods and general supplies arrive at Nahanni Butte by the same means as were described for Fort Liard. An additional barge tariff of \$0.25 per cwt must be added to the aggregate rate specified for the latter named settlement.

### Consumption of Electric Power

The total consumption of power in the settlement amounted to 23,072 KWH for the fiscal year, with distribution as follows: Government 83.6% - domestic 16.4%.

### Commercial Establishments

#### Nahanni Outfitters

This locally-based company operates a number of hunting camps higher in the valley of the South Nahanni River and the surrounding country. The owner was absent during the course of field-work so information relative to the operation was unavailable.

#### Nahanni Butte Store and Trading Post

According to its owner, Mr. A. G. Turner, the store operation grossed approximately \$24,000 in a period corresponding approximately to the fiscal year selected by the survey. The owner estimated the distribution of his gross take over the Indian income-sources, and also over the merchandise available, to be approximately as presented in the summary below.

| SOURCES            |               | DISTRIBUTION TO MERCHANDISE |              |
|--------------------|---------------|-----------------------------|--------------|
| Trapping           | \$ 5,000      | Hardware Items              | 16.6 percent |
| Soc. Legis. & Ass. | 3,500         | Dry Goods                   | 20.8 percent |
| Handicrafts        | 500           | Groceries                   | 56.3 percent |
| Private Labour     | 4,000         | Petroleum Products          | 6.3 percent  |
| Government Labour  | 11,000        |                             |              |
| Total              | <u>24,000</u> |                             |              |

Data Source: A. G. Turner, Nahanni Butte

Credit extensions by the store average about \$100 per month for each household. It is usually highest in October, immediately prior to the commencement of the trapping season, and lowest during the summer months.

### TROUT LAKE

#### CAPITAL INVESTMENT

Investment at Trout Lake includes mainly the native housing; a warehouse/patrol cabin of the Mackenzie Forest Service; a small combination church and

living quarters of the Catholic Mission of Fort Liard, and a sports fishing camp on the east shore of the lake which is owned by A. G. Turner of Nahanni Butte. The values are summarized as follows:

TABLE 39

CAPITAL INVESTMENT - TROUT LAKE

Government

| <u>Installations</u>                        | <u>Fixture/Furniture</u> | <u>Equipment</u> |
|---|--------------------------|------------------|
| \$ 9,000 (E-80%)                            |                          | 1,500 (E)        |
| Data Source: D. I. A. N. D. , and estimates |                          |                  |

Institutions (R. C. Mission)

|                        |     |
|------------------------|-----|
| 2,500                  | 500 |
| Data Source: Estimates |     |

Commercial (Sports fishing camp)

|                        |           |           |
|------------------------|-----------|-----------|
| 5,000 (E)              | 2,500 (E) | 3,000 (E) |
| Data Source: Estimates |           |           |

Private

|                        |           |           |
|------------------------|-----------|-----------|
| 40,000 (E)             | 5,000 (E) | 5,000 (E) |
| Data Source: Estimates |           |           |

|          |       |       |
|----------|-------|-------|
| \$56,500 | 8,000 | 9,500 |
|----------|-------|-------|

|   |               |          |
|---|---------------|----------|
| <u>Total capital investment in the settlement of Trout Lake</u> | <u>74,000</u> | <u>+</u> |
|---|---------------|----------|

LABOUR FORCE

Potential Labour Force

Proceeding on the basis used for the previous settlements, the potential labour force consists of 10 males and 9 females, with a potential output of 4,655 man-days.

Utilization of the Labour Force 1967/68

Only about 367 man-days were expended on wage-labour tasks during the subject fiscal year, and all of it was casual employment on public works projects. This represents about an 8% utilization of the potential labour force for that purpose.

### Labour Force Projection to 1979

By the end of 1978 the net labour force of Trout Lake, based on the existing population, will have reached a total of roughly 30 individuals with a potential output of 7,350 man days; equivalent to an increase of approximately 36% over current potential.

### HOUSEHOLD INCOME

In terms of computable income, the residents of Trout Lake are undoubtedly the poorest in the region, and perhaps in N.W.T. as well. As was the case when discussing Nahanni Butte, it is important to note that the following table depicting income for Trout Lake for the fiscal year 1967/68 carries a higher than normal sum for public works projects which tends to inflate the average household income beyond that which might be expected in other years.

TABLE 40

#### DISTRIBUTION OF INCOME BY HOUSEHOLD - TROUT LAKE

| House-<br>hold                       | Occu-<br>pants | Wage Labour<br>Gov. | Priv. | Trap-<br>ping | Soc.<br>Legis. | Soc.<br>Ass. | Total  |
|--------------------------------------|----------------|---------------------|-------|---------------|----------------|--------------|--------|
| 1                                    | 5              | 802                 |       | 496           | 240            |              | 1538   |
| 2                                    | 5              |                     |       |               | 1548           | 60           | 1608   |
| 3                                    | 2              | 201                 |       | 34            | 2232           |              | 2467   |
| 4                                    | 5              | 274                 |       | 269           | 216            |              | 769    |
| 5                                    | 5              | 73                  |       | 02            | 1384           |              | 1469   |
| 6                                    | 4              | 1621                |       | 953           |                |              | 2574   |
| 7                                    | 5              | 709                 |       | 62            | 84             | 216          | 1071   |
| 9                                    | 10             | 1849                |       | 52            | 384            |              | 2285   |
| <u>Households at top end of lake</u> |                |                     |       |               |                |              |        |
| 13                                   | 2              | 36                  |       | 40            |                |              | 76     |
| 14                                   | 1              | 302                 |       | 632           |                |              | 934    |
| Totals:                              |                | 5,867               | -     | 2,550         | 6,088          | 276          | 14,781 |

Data Source: D.I.A.N.D., Fort Simpson



On the strength of the foregoing income computations, the average household income was \$1478 and the per capita income was about \$336. The survey was informed that the public works allotment for the fiscal year 1968/69 was to be approximately \$2000, and this could reasonably be expected to constitute the norm. In these circumstances the average household income in normal years is probably in the order of \$1000, and per capita income about \$240. This will tend to support the earlier statement regarding the poorness of the community in terms of monetary income.

### SOURCES OF INCOME

Social legislation is the most important source of income in the community of Trout Lake and is apt to remain so for some time to come. Trapping should be a more important contributor than it appears to be, but extreme isolation and the probable lack of preparedness for the trap-line appear to militate against the possibility of a significant improvement in this source.

The credit rating of the Trout Lake natives is not highly regarded at either Fort Simpson or Fort Liard and it becomes necessary for them to "juggle" their purchasing from one to the other settlement, depending upon the degree of their indebtedness.

Some support for the awareness of the Trout Lake natives to the need for spreading their accounts in this fashion is evident in the following summary of fur trading by them during 1967/68. The percentages shown allude the total harvest in table 40.

|                   |                            |                         |                       |
|-------------------|----------------------------|-------------------------|-----------------------|
| <u>Traded to:</u> | R. J. Jones (F. t Simpson) | H. B. Co. (Ft. Simpson) | H. B. Co. (Ft. Liard) |
|                   | 10%                        | 28%                     | 62%                   |

### OTHER ASPECTS OF THE ECONOMY

#### Country Food

The community of Trout Lake is necessarily dependent to a high degree on country food for sustenance throughout the year. Fishes form a very large part of the diet, with the major part of the balance consisting of moose-meat. Fishing occurs at most times of the year and comparatively large quantities are preserved by smoking.

Considerable fishing takes place in ice-free periods requiring the use of out-board motors, and this is hindered by an almost chronic shortage of fuel and lubricants. Fuel is generally flown-in by light charter aircraft having a small payload capability with the result that it becomes extremely costly. For example, fuel landed at Trout Lake by a light aircraft out of Fort Simpson with a payload of

roughly 40 gallons of gasoline, would have a landed cost-price of roughly \$3.28 per gallon. Freight charges would account for approximately 81% of the landed cost per gallon.

The only alternative method of bringing in fuel would be by winter road, but this could only be done efficiently on the basis of about a three-year supply to take full advantage of the truck capacity. Unfortunately, the community is too financially starved to consider supply on such a scale, and is frequently hardpressed to afford its present meagre supply by aircraft. The harvesting of country food generally is severely hampered by this chronic shortage of motor fuel.

### Harvesting Equipment

The value of the harvesting equipment owned by the natives has already been included under private capital investment, where these have an item value in excess of \$100. The amount and type of equipment are summarized as follows:

| Canoes | Scows | Ski-doo's | Dog-Teams | Outboard Motors |
|--------|-------|-----------|-----------|-----------------|
| 13     | 1     | 2         | 10        | 9               |

Dogs are used frequently in teams of four or five animals, or as individual pack animals. Some of the canoes are still serviceable, although in use for ten or more years. Mechanical equipment such as ski-doo's and outboard motors suffer badly for lack of proper service and spares. Fish nets, usually supplied by D. I. A. N. D. , are generally well cared for and the natives have been taught their proper use by projects officers of that Department.

### JEAN MARIE

#### CAPITAL INVESTMENT

The settlement of Jean Marie is the only one featuring an Indian-owned and operated commercial venture, manufacturing a finished product for the general market. It was not until 1968, however, that the Indian community itself had invested its own financial resources in the procurement of productive machinery. The D. I. A. N. D. has a residual investment in the enterprise in the form of a D6 caterpillar and a small planer-mill.

Other Government investment in the community consists of a school/teacherage; a fuel-oil storage and distribution system to Government buildings; a power-house and electrical distribution system and an airstrip and loading wharf.

Institutional investment in the community features small log buildings owned by the R. C. Mission and the Pentecostal Alliance for accommodation and religious teaching.

Private investment includes buildings, production machinery, and harvesting equipment owned by the Indian residents.

TABLE 41

CAPITAL INVESTMENT - JEAN MARIE

Government

| <u>Installations</u>                               | <u>Fixtures/Equipment</u> | <u>Equipment</u> |
|--|---------------------------|------------------|
| \$ 88,000  | 7,000 (E)                 | 33,000 (E)       |
| <u>Data Sources: D. I. A. N. D., and estimates</u> |                           |                  |

Institutional (R. C. Mission & Pentecostal Alliance)

|                                |           |  |
|--------------------------------|-----------|--|
| 10,000 (E)                     | 3,500 (E) |  |
| <u>Data Sources: Estimates</u> |           |  |

Commercial (Indian-owned saw-mill)

|  |  |       |
|--|--|-------|
|  |  | 4,000 |
| <u>Data Sources: R. C. Mission, Fort Simpson</u> |  |       |

Private

|                                |            |           |
|--------------------------------|------------|-----------|
| 40,500 (E)                     | 13,500 (E) | 6,000 (E) |
| <u>Data Sources: Estimates</u> |            |           |
| \$ 138,500                     | 24,000     | 43,000    |

|   |                  |          |
|---|------------------|----------|
| <u>Total capital investment in the settlement of Jean Marie</u> | <u>\$205,500</u> | <u>+</u> |
|   |                  | -        |

LABOUR FORCE

Potential Labour Force

The population structure diagram for Jean Marie, fig. 6, indicates a potential labour force of 15 males and 10 females. The potential output of this force amounts to 6,125 man-days.

Utilization of the Labour Force 1967/68

Time expended on wage-labour pursuits by the natives of Jean Marie during the aforementioned fiscal year amounted to roughly 16.2% of the available potential in the community. This was distributed as follows:



|                 | <u>Permanent</u> | <u>Part-Time</u> | <u>Casual</u> | <u>Total</u> |
|-----------------|------------------|------------------|---------------|--------------|
| <u>Man-days</u> | 245              | 625              | 124           | 994          |

The 625 man-days expended under "part-time wage-labour" was in connection with saw-mill and logging operations.

#### Labour Force Projection to 1979

The net size of the labour force at Jean Marie at the end of 1968 will consist of 42 individuals with an output potential of 10,290 man-days, representing an increase of approximately 40% over present potential

#### HOUSEHOLD INCOME

In the income table which follows, two amounts are undistributed over the households. The first of these, \$9300, represented income from lumber sales which it was impossible to assign, and the second amount of \$5021 represented income from fur sales paid to one individual in trust for other trappers in the community. It was, likewise, impossible to assign specific amounts from this source to individual households.

TABLE 42

#### DISTRIBUTION OF INCOME BY HOUSEHOLD - JEAN MARIE

| House-<br>hold        | Occu-<br>pants | <u>Wage Labour</u> |       | Trap-<br>ping | Soc.<br>Legis. | Soc.<br>Ass. | Total  |
|-----------------------|----------------|--------------------|-------|---------------|----------------|--------------|--------|
|                       |                | Gov.               | Priv. |               |                |              |        |
| 2                     | 16             | 676                |       | 131           | 1220           |              | 2027   |
| 3                     | 7              | 6136               |       |               | 96             |              | 6232   |
| 4                     | 8              | 311                |       | 1366          | 240            |              | 1917   |
| 5                     | 8              | 177                |       |               | 424            | 1105         | 1706   |
| 6                     | 4              | 55                 |       | 156           | 96             |              | 307    |
| 8                     | 7              | 763                |       | 193           | 312            |              | 1268   |
| Total                 |                | 8,118              |       | 1,846         | 2,388          | 1,105        | 13,457 |
| Undistributed Income: |                |                    | 9,300 | 5,021         |                |              |        |
| Total                 |                | 8,118              | 9,300 | 6,867         | 2,388          | 1,105        | 27,778 |

Data Sources: D. I. A. N. D. , Jean Marie Indians, N. W. T. fur returns.



It is unfortunate that the value of the distribution table is considerably reduced by the inordinately high amounts included as undistributed income, but some community practices in the handling of money make it virtually impossible to carry an examination of this kind to the desired conclusion.

From all accounts, table 42 above can be considered fairly representative of the community income at Jean Marie during recent years. Based on these data the average household income for 1967/68 was about \$4620, and the per capita income approximately \$555.

### SOURCES OF INCOME

There is but one permanently employed individual in the settlement and he covers - off the D. I. A. N. D. positions of power-plant operator and school janitor. His remuneration represents about 75.5% of the sum shown under Government wage-labour in the table. The balance in this category is made up of casual labour in respect of public works projects originating with D. I. A. N. D.

The community owned and operated saw-mill was the largest single source of income for the community and wage-labour connected with it was classed "part-time" under the utilization of the labour force discussed previously. Virtually every household is assured of some income from the saw-mill during its annual operating period.

Trapping is an important contributor to the economy of Jean Marie, but is viewed by the Indians as a last resort source of income. If lumber orders of sufficient value could be obtained, trapping would quickly disappear as an income source of any import.

Handicraft production in the community was a negligible contributor to income during the fiscal year and is not likely to be developed by these people.

### OTHER ASPECTS OF THE ECONOMY

#### Harvesting Equipment

The harvesting equipment with a value in excess of \$100 owned by the Jean Marie Indians is as follows:

| Canoes | Scows | Dog-Teams | Ski-doo's | Outboard Motors |
|--------|-------|-----------|-----------|-----------------|
| 10     | 7     | 7         | 1         | 12?             |

The estimated value of these items has been included under private capital investment. Equipment generally appeared to be in good repair and, to a large extent, this is probably due to the proximity of Jean Marie to Fort Simpson, where spare parts are either obtainable or can readily be ordered.

### Consumption of Electric Power

Consumption for a recent one-year period amounted to approximately 22,500 KWH. The ratio of domestic to Government consumption could not be determined.

### Consumption of Fuel Oil

For the diesel plant the consumption of fuel oil amounted to approximately 2500 gallons. Records were not available for the amount of fuel consumed by the school/teacherage, but a similar installation at Fort Liard used some 2769 gallons in 1967/68. It is probably safe to presume, therefore, that the total consumption for Jean Marie would have been roughly 5300 gallons for the period.

### Commercial Establishments

#### Jean Marie Cooperative Saw-mill

Previous mention was made to the effect that the saw-mill is not a formal company but functioned rather under a loose agreement among the Indians to engage in the production of finished lumber. The operation has been dependent throughout its life upon some of the more minor requirements of the Government for lumber in nearby settlements. The principal production appears to have been for the construction of wooden sidewalks in the settlements, but siding and squared timbers for the use in house construction have also been produced.

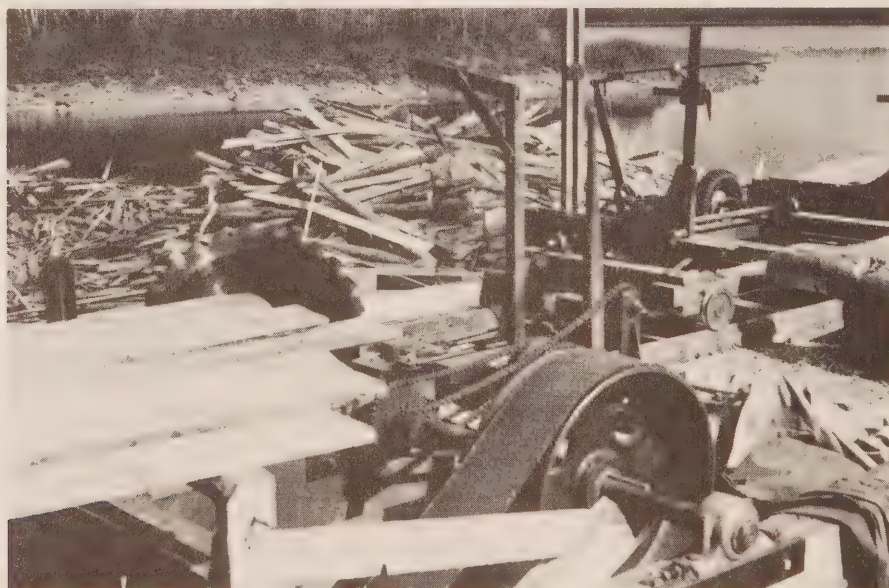


Plate 28 - View of the Jean Marie Cooperative saw-mill, located on the right bank of the Jean Marie River. The planer-mill, not visible in the photograph, is located about twenty feet to the right. The saw-mill was purchased new in July, 1968.

As near as could be determined from the available records, the 1967/68 production amounted to 71,666 FBM supplied to D. I. A. N. D. and Northern Canada Power Commission.

Depending upon circumstances at the time of delivery, finished lumber may be picked-up by a barge of the Northern Transportation Commission for delivery to the appropriate purchaser or, alternatively, may be delivered by means of a small outboard-motor-powered barge owned by the Jean Marie community. At one time a small tug was used for moving the barge but it is presently unserviceable.

The saw-mill is operated under the supervision of a resident Indian who has received training as a sawyer at saw-mills located outside the Lower Liard Region. This individual informed the writer that the wage rate agreed-upon by the community was \$1.85 per hour, and that it was incumbent on the cooperative that each family share in the wage-labour opportunity afforded by the saw-mill.

#### FORT SIMPSON

An explanation appeared earlier in the report to account for the absence of certain detail concerning the economy of Fort Simpson. Briefly, the settlement was considered to be outside, or at least on the very fringe of the study region, and would be incorporated in the survey only to the extent that time permitted.

As the field-work proceeded it became evident that little could be gained from spending an undue amount of time in settlements such as Trout Lake and Nahanni Butte and that it might be put to better use in Fort Simpson. Even so, certain objectives could not be accomplished and the more important of these was a distribution of income by households. Lacking also is a summary of harvesting equipment.

Apart from these omissions, a broad appreciation of the economy of Fort Simpson is presented and could form the basis for a more detailed work on that settlement if required.

#### CAPITAL INVESTMENT

Fort Simpson is the largest of the permanent population centres considered in the report. Government investment in the community began in a noticeable way in the 1920's with the establishment of an Army weather station. The remaining installations appeared after 1940, culminating in the construction of a large school and hostel complex in the late 1950's.

At an earlier time the settlement received consideration as the future capital of N. W. T., but studies by Pfeffer (1962), and others, indicated that it was not particularly well located with respect to probable developments in communications and major natural resources.



At an earlier time the settlement received consideration as the future capital of N.W.T., but studies by Pfeffer (1962), and others, indicated that it was not particularly well located with respect to probable developments in communications and major natural resources.

TABLE 43  
CAPITAL INVESTMENT - FORT SIMPSON

Government

|                                  | <u>Installations</u> | <u>Fixtures/Furniture</u> | <u>Equipment</u>  |
|----------------------------------|----------------------|---------------------------|-------------------|
| D.I.A.N.D.                       | \$ 2,023,000         | \$ 131,000 (E)            | \$ 83,000 (E-10)  |
| N.C.P.C.                         | 160,000              |                           | 215,000           |
| D.N.H.W.                         | 99,000               | 4,500 (E)                 | 25,000            |
| R.C.M.P.                         | 118,000              | 14,000                    | 2,800             |
| D.O.T.                           | 928,500              | 24,000                    | 100,000           |
| D. AGR. (Experi-<br>mental Farm) | 70,000               | 8,000 (E)                 | 12,000            |
| <u>TOTAL Government</u>          | <u>\$ 3,398,500</u>  | <u>\$ 181,500</u>         | <u>\$ 437,800</u> |

Data Sources: D.I.A.N.D., N.C.P.C., D.N.H.W., R.C.M.P., D. AGR., D.O.T. and estimates.

Institutions

(R.C. Mission and St. Margaret's hospital)  
(Anglican Mission)  
(Pentecostal Mission)

\$ 231,000(E-62%) \$25,000 (E) \$ 10,000 (E)

Data Sources: D.N.H.W., and Estimates

Commercial

Hudson's Bay Co., Canadian National Telecommunications,  
Imperial Oil Ltd., Simpson Construction Ltd., Mark's  
Northern Service Ltd., J.R. Cree Bulk Oil Sales Ltd.,  
Arctic Air Ltd., Lindberg Transport Ltd., Fort Simpson  
Hotel, R.J. Jones and the Igloo Theatre.

\$ 571,000(E-19%) \$51,000 (E-62%) \$ 175,000 (E-4)

Data Sources: H.B. Co., CNT., Imp. Oil, Simpson Const., and estimates





### Utilization of the Labour Force 1967/68

An approximation of the utilization of the labour force in wage-labour was as follows:

|        | <u>Government Sources</u> | <u>Private Sources</u> |                 |
|--------|---------------------------|------------------------|-----------------|
| Indian | 10,687                    | 4,570                  | <u>man-days</u> |
| Metis  | 3,206                     | 1,025                  | " "             |

The expenditures in man-days tabulated above means that 28.4% of the Indian labour potential was utilized during the fiscal year, and 37.5% of the Metis potential. The importance of the Government presence in the economy of the Indian and Metis peoples hardly needs emphasizing; but, in spite of this, it is very probable that these peoples are not being as fully utilized as is possible within the prevailing magnitude of Government financial resources expended in the settlement relative to wage labour.

### Labour Force Projection to 1979

Based on the existing populations of Indian and Metis peoples, the labour force should reach a net size by the end of 1978 as indicated below:

Indian - 354 individuals - output potential 86,730 man-days - increase 38%

Metis - 63 individuals - output potential 15,435 man-days - increase 27%

### INCOME

The distribution of income over households could not be accomplished during the survey, but the very least that could be done was to attempt its distribution among the ethnic groups, with regard to their particular status of residence.

TABLE 44

#### DISTRIBUTION OF INCOME - FORT SIMPSON

| Ethnic Group | <u>Wage Labour</u> <sup>1</sup> |               | Trap-<br>ping | Handi-<br>crafts | Soc.<br>Legis. | Soc.<br>Ass. | Total   |
|--------------|---------------------------------|---------------|---------------|------------------|----------------|--------------|---------|
|              | Gov.                            | Priv.         |               |                  |                |              |         |
| Indian       | 171,700                         | 73,132        | 36,100        | 5,300            | 41,240         | 19,230       | 346,702 |
| Metis        | 51,300                          | 16,400        | 1,000         |                  | 13,944         | 4,051        | 86,695  |
| White        |                                 |               |               |                  |                |              |         |
| Floating     | 438,000                         |               |               |                  | 4,440          |              | 442,440 |
| Permanent    | 12,000(E)                       | 66,700(E-40%) |               |                  | 2,148(E)       | 40           | 80,888  |
| Totals       | 673,000                         | 156,232       | 37,100        | 5,300            | 61,772         | 23,321       | 956,725 |

NOTE: Wage-Labour necessarily includes salaries.

Data Sources: D.I.A.N.D., N.C.P.C., D.O.T., D.N.H.W., D. Agr., H.B. Co., Simpson Const., J.R. Cree Bulk Oil Sales, Mark's Northern Service, Lindberg Transport, R.J. Jones, Arctic Air, Fort Simpson Hotel, St. Margaret's Hospital, R.C. Mission, Anglical Hostel and the R.C. Hostel.

About 65% of the sum assigned to Government wage-labour devolved upon the floating White component of the population and, moreover, about one third of the sum disbursed to that group represented remuneration in connection with education.

The only complete data that could be uncovered relative to income in previous years was contained in a departmental report submitted by the Superintendent of the Fort Simpson Agency on February 28, 1963 in which he stated the earnings of the Indians for the calendar year 1962. It is quite pertinent to include these data, because they relate only to wage-labour and demonstrate rather well the extent to which the Government can be drawn into a position of almost totally supporting the economy of settlements.

Judging by the distribution of wage-labour over Government and private sources in 1962, both stood within a few thousand dollars of one another as contributors.

These amounts were:

| <u>Government Sources</u> | <u>Private Sources</u> | <u>Total</u> |
|---------------------------|------------------------|--------------|
| \$ 87,823                 | \$ 68,118              | \$155,118    |

A comparison of these data with the wage-labour income values derived by Indians some five years later, as depicted in table 43, shows that the Government has increased its input through wage-labour by 48%, while the corresponding input from private sources has increased by only 6.8%.

#### Per Capita Income

The distribution of income on a per capita basis for the fiscal year 1967/68 is presented in table 45 below. It has been arrived at using the population structures appearing in chapter 3, and the income data contained in the present chapter. Great accuracy is not a claim of the table, but just about every conceivable source of tangible income was examined in the survey process in order to avoid sizeable omissions.

---

<sup>1</sup> The estimated content under "wage labour" can be considered negligible in view of the relatively large sums involved. Estimates were included to account for the salaries of R.C.M.P. officers, of which there were two, and an estimate was made of the probable amounts drawn by some of the permanent Whites as salaries from their businesses. The latter are included in the sum shown for private wage-labour.



TABLE 45PER CAPITA DISTRIBUTION OF TOTAL INCOME

| <u>Ethnic Group</u>      | <u>1967/68</u> |              |                                  |                 |
|--------------------------|----------------|--------------|----------------------------------|-----------------|
|                          | <u>Indian</u>  | <u>Metis</u> | <u>White</u><br><u>Permanent</u> | <u>Floating</u> |
| <u>Per Capita Amount</u> | \$ 739         | \$ 903       | \$ 1,797                         | \$ 2,011        |

Data Source: Area Survey

SOURCES OF INCOME

Notwithstanding the importance of Government in the economy, it would be of interest to show a percentage distribution of income over the several sources which contributed during the 1967/68 fiscal period. The distribution will concern itself only with the permanent population made up of the Indian, Metis and White ethnic groups.

TABLE 46DISTRIBUTION OF INCOME BY SOURCES

(in percent)

| <u>Source and</u><br><u>Ethnic Group.</u> | <u>Wages</u> |              | <u>Trap-</u><br><u>ping</u> | <u>Handi-</u><br><u>crafts</u> | <u>Social</u><br><u>Legis.</u> | <u>Social</u><br><u>Assis.</u> |
|---|--------------|--------------|-----------------------------|--------------------------------|--------------------------------|--------------------------------|
|   | <u>Gov.</u>  | <u>Priv.</u> |                             |                                |                                |                                |
| Indian                                    | 49.5         | 21           | 10.4                        | 1.5                            | 11.9                           | 5.6                            |
| Metis                                     | 59.1         | 18.9         | 1.2                         | -                              | 16                             | 4.7                            |
| White (Permanent)                         | 14.8         | 82.5         | -                           | -                              | 2.6                            | 0.05                           |

Data Source: Area Survey Data

Wage Labour

Of the Government wage-labour sources for Indian and Metis peoples, D.I.A.N. contributes 46% of all monies paid-out with respect to wages, and N.C.P.C. contributes approximately 34%. The balance of 20% is spread over the remaining Departments and official agencies noted elsewhere in the report. Of the larger Departments present in the community, D.O.T. offers the least employment opportunity to the Indian and Metis peoples. The underlying reason for this can be attributed to the highly specialized nature of the skills required in fulfilling the responsibilities of this Department relative to the operation of airports and electronic communications equipment.



Of the private wage-labour sources for the Indian and Metis peoples, Simpson Construction is undoubtedly the most important in terms of total wages paid-out to the aforementioned ethnic groups; but is not necessarily the most important in terms of the numbers employed. This company, and the remaining private companies generally, normally employ to the limit that their financial capability allows for that purpose.

Most private wage-labour sources are, themselves, directly dependent upon Government contractual work for survival. Exception are the Fort Simpson Hotel, and to a lesser degree Lindberg Transport and Mark's Northern Service. The single largest recipient of Government contractual work was Simpson Construction which, in 1967/68 - according to D.I.A.N.D. records - was awarded work with a value in excess of \$50,000 by that Department.

Most of the related contracts involved road construction and maintenance work in and about the settlement; including the earth causeway between the island and mainland. The company also engaged in private contractual work, the financial extent of which is not the subject of discussion in this report.

### Trapping

The distribution of income by sources makes a very interesting comparison between trapping and other categories of income and, moreover, points up the very strong and understandable preference for wage-labour.

When speaking of Fort Liard earlier in this chapter, mention was made about the method of disposing of part of the fauna harvest to the fur auctions via the Game Branch of D.I.A.N.D. In 1967/68 approximately 22% of the total harvest of Fort Simpson trappers was disposed of in this particular way. This is an interestingly high percentage probably attributable to certain of the Fort Simpson trappers being better able to sustain themselves while awaiting full payment from the fur auction houses. The plan does, nevertheless, still contain the disadvantages discussed under Fort Liard.

A precise calculation of income from trapping in previous years would be just about impossible to make without a long-lasting and thorough investigation of all types of sales. However, if we employ data contained in the Northwest Territories Fur Returns covering sales to licensed traders and auction houses, a reasonable approximation of what happened in previous years should result. The table which follows employs as a basis for calculation, the average trader-price by species for the years specified, and the average price of the auction house at Edmonton in respect of private sales. The average prices of the auction house have already been provided in table 35 under Fort Liard and need not be repeated here.

TABLE 47

| Year                 | Beaver | Lynx  | Marten | Mink  | Muskrat | Squirrel |
|----------------------|--------|-------|--------|-------|---------|----------|
| 1966/67 Trader Sales | 1121   | 74    | 1157   | 108   | 1089    | 602      |
| Private "            | 233    | 24    | 585    | 33    | 524     | 464      |
| Av. Trader Price     | 9.97   | 26.68 | 12.49  | 13.49 | 0.54    | 0.4      |
| 1965/66 - ditto -    | 1325   | 147   | 967    | 212   | 923     | 1996     |
|                      | 328    | 111   | 271    | 22    | 553     | 2025     |
|                      | 11.31  | 22.52 | 13.42  | 16.18 | 0.95    | 0.4      |
| 1964/65 - ditto -    | 1667   | 116   | 829    | 187   | 720     | 930      |
|                      | 367    | 85    | 415    | 51    | 473     | 766      |
|                      | 11.22  | 12.98 | 9.56   | 17.79 | 0.96    | 0.4      |
| 1963/64 - ditto -    | 1678   | 456   | 585    | 208   | 690     | 500      |
|                      | 282    | 284   | 991    | 85    | 430     | 478      |
|                      | 14.20  | 13.46 | 10.11  | 22.86 | 1.03    | 0.4      |
| 1962/63 - ditto -    | 805    | 952   | 369    | 463   | 203     | 782      |
|                      | 472    | 500   | 580    | 147   | 934     | 1924     |
|                      | 12.87  | 9.95  | 8.06   | 20.36 | 0.74    | 0.31     |

Data Source: N.W.T. Fur Returns (Trader & Private Sales refers to number of skins)

It is rather important to note that the table above includes also the annual harvests of Jean Marie, and perhaps a small element of the Wrigley harvest; it being impossible to isolate them from the returns. For the sake of comparison, therefore, it is necessary to add the trapping income of Jean Marie for 1967/68 to that of Fort Simpson for the same period. This is taken into account in the table below.

TABLE 48

TRAPPING INCOME - AGGREGATING TRADER & PRIVATE SALES

(in dollars)

| 1967/68 | 1967/66 | 1966/65 | 1965/64 | 1964/63 | 1963/62 |
|---------|---------|---------|---------|---------|---------|
| 43,967  | 50,730  | 46,391  | 45,869  | 74,332  | 64,952  |

Data Sources: N.W.T. Fur Returns, and Edmonton Fur Auction Sales, Alberta.

Handicrafts

By and large this source of income is negligible in the income spectrum and is not apt to undergo appreciable development in a community like Fort Simpson which favours itself as a developing distribution and commercial centre. The items of handicraft produced locally are not of exceptional quality and are rather highly priced. These two factors account in no small way for the low production, but perhaps of importance, too, is the fact that there is already a flood of superior products of similar type on the market.

Most of the products produced as handicrafts are made from animal hides. Lapidary work is taught at the federal day school and some attractive costume jewellery has resulted. Unfortunately, the manufacture of costume jewellery is a highly competitive business and unless something distinctly "Indian" can be designed and protected, there is little reason to suppose that a livelihood could result for local people who may decide to produce items of this particular kind.

## OTHER ASPECTS OF THE ECONOMY

### Cost of Freight

In the cases of Fort Liard and Nahanni Butte it was shown that the movements of goods and all manner of supplies was directly from Edmonton via Fort Nelson, B.C. Where Fort Simpson is concerned, such activity, although it usually originates with goods first marshalled in the major centre of Edmonton, generally requires processing through the N.W.T. distribution centre of Hay River. As explained in the chapter on "communication systems" goods can arrive, or leave, Fort Simpson by river barge, winter-road or air. Between Edmonton and Hay River, railway can be added. In actual practice, however, freight between Hay River and Fort Simpson usually moves via winter road or barge due to the high cost of air transport.

The cost of freight is subject to several variables, not the least of which are the cargo class and vehicle loading. It can be seen from the rates presented in the chapter on "communication systems" that general cargo trucked from Edmonton direct to Fort Simpson would add between 2.8 and 5 cents per pound, to the retail prices of merchandise. Alternatively, a combination of truck and barge would add between 3.8 and 4.3 cents per pound, using the N.T.C. barge facility. Costs would be slightly higher still, using the private barging company. Perishable cargos are substantially costlier, costing usually in excess of 6 cents per pound.

It would be unfair to say that the cost of freight alone is responsible for the higher retail prices of food-stuffs at Fort Simpson. This is often given as the sole reason, but there seems good reason to suppose also that retail merchants often transcend reasonable bounds in determining mark-up, especially when certain food-stuffs are in short supply. Large sums of money leave the community annually for private purchases of commodities from the large suppliers at Edmonton and local retail price practices are, at least in part, responsible for this demonstration of preference.

Freight costs may be expected to settle at reasonably attractive levels once the Mackenzie Highway extension is completed in the near future. This all-weather highway will, as well, give residents of Fort Simpson a greater freedom of choice in purchasing because it should be possible to drive comfortably to Hay River and return in less than a day in order to take advantage of more favourable prices.



Consumption and Cost of Fuels

TABLE 49  
FUEL CONSUMPTION 1967  
 (in gallons)

| Aviation<br>Gas | Turbo<br>Fuel | Furnace<br>Oil | Diesel<br>Oil |
|-----------------|---------------|----------------|---------------|
| 64,220          | 1,125         | 203,940        | 59,530        |

Data Source: Imperial Oil Ltd., Edmonton

Fuel prices prevailing in the summer of 1968 were:

|                     |         |                 |                    |                     |
|---------------------|---------|-----------------|--------------------|---------------------|
| <u>Aviation Gas</u> | 80/87   | 49.7 cents gal. | <u>Heating Oil</u> | 23.2 cents per gal. |
|                     | 100/130 | 51.7 cents gal. | <u>Diesel Oil</u>  | 25.2 cents per gal. |

Gasoline for automobiles is available in two grades, at prices not markedly higher than those in some southern localities.

<sup>1</sup> A few examples of commodity prices that were current at Fort Simpson and Ottawa are given in appendix 11. If these locations are considered too widely separated for comparison it would be cogent to mention that commodity prices at Fort Nelson, B. C. were only fractionally higher than those obtained in Ottawa and used in the comparison.

Additional to fuel consumption statistics shown in the foregoing table is the consumption of the N. C. P. C. operated installations. More particularly the heating plant and the power plant. According to information received from N. C. P. C. fuel brought in during the 1967/68 fiscal year amounted to: 240,000 gals. of bunker oil and 180,000 gals. of diesel oil. N. C. P. C. imports this directly from the Imperial Oil Co. refinery at Fort Norman and the local agent, J. R. Cree Bulk Oil Sales, is excluded from the transaction. The prices for these fuels to N. C. P. C. f. o. b. Fort Norman are: bunker - 9.3 cents per gal. and diesel - 12.6 cents per gal.

Consumption and Cost of Electric Power & Potable Water

Power output to the community during the specimen fiscal year amounted to approximately 2,500,000 KWH. The approximate distribution over user categories was: domestic - 830,000 KWH; Government and commercial - 1,376,000 KWH; station service - 113,000 KWH, and roughly a further 181,000 KWH may be attributed to line-loss.

The existing water-filtration plant is operated at capacity and in the specimen fiscal year produced approximately 39,000,000 gals. The distribution by user categories was not available.

The rates charged for these services are exceptionally high by southern standards. Some idea of the differences involved is conveyed by the following comparisons made between Fort Simpson and the city of Ottawa rates for similar services.

#### Domestic Users

Fort Simpson - Electric Power: 1 - 10 KWH, \$2.22 (also minimum building);  
11 - 75 KWH, 8.8 cents per KWH; more than  
75 KWH, 5.5 cents per KWH.

Water - \$14.00 per month, with sewage charge an extra \$3.60  
per month.

City of Ottawa - Electric Power: Service charge of \$1.32 each two months,  
plus - 0 - 120 KWH at 2 cents per KWH; 121 - 240 KWH,  
1 cent per KWH; 241 - 2000 KWH, .5 cents per KWH; over  
2000 at 1 cent per KWH.

Water: 21 cents for each 625 gallons

#### Sources of Data: N. C. P. C., Fort Simpson, and City of Ottawa

Based on an arbitrary consumption of 1200 KWH of electricity in a given month in either location; the comparative costs to the respective users would be:

| <u>Fort Simpson</u> | <u>Ottawa</u> |
|---------------------|---------------|
| \$ 2.22             | \$ 0.66       |
| 5.72                | 2.40          |
| 61.87               | 1.20          |
| <u>\$69.81</u>      | <u>4.80</u>   |
|                     | \$ 9.06       |

It may be of interest to note that the Canada Tungsten Mine, power-generating facility at Tungsten, N. W. T., also a diesel plant, produced just under 5,000,000 KWH of electricity at a total cost of \$0.04 per KWH during the past year.

#### Commercial Institutions

##### N. W. T. Liquor System

It was previously noted that for the purposes of the report this Government agency would be classed as an ordinary retailing establishment because it sells a consumable commodity directly to the general public. The store is operated by two clerks employed by the Liquor System and is located on rented premises.

From the time of its opening on 10 February, 1968 up to and including the 6 July, 1968 the store had retailed 10,000 half-cases of beer of twelve pints each at the price of \$4.20 per half-case. As consumption is unlikely to decrease, it is reasonable to project annual sales at roughly 24,000 units at \$100,800. On the strength of this projection about ten per cent of the total annual income of the populace, based on the income compilation for 1967/68, can be expected to leave the community via the Liquor System in 1968/69.

The addition of hard liquor to the store merchandise on 2 August, 1968 will undoubtedly compete with beer sales to some extent, but is very apt to make the monetary value of the sales projection a very conservative one.

#### Hudson's Bay Co.

The bulk of general merchandise business in the community is transacted by this company which at one time could count as many as four competitors in the community (Report of the Superintendent Fort Simpson Indian Agency, 1 March, 1962 p.6). At the time of the survey, only one competitor was still in business, but a former competitor was contemplating reopening his store late in 1968.

The H.B. Co. employs about six Indian and Metis as clerks/general helpers, at hourly rates ranging from \$1.25 to \$2.05.

#### Other

The balance of the private businesses active in the community are for the most part primarily family enterprises only recently incorporated as private limited companies. In a community the size of Fort Simpson it is obvious that these companies have had a difficult struggle financially, and, for some at least, these difficulties remain. Whatever their success, the companies owe a great deal to the considerable management and administrative abilities of the female members of the husband and wife teams responsible for their operations.

Hourly rates for general labour range from a low of \$1.25 to \$2.25. The latter rate was noted in the case of only one company and the usual maximum was about \$2.05 per hour.

One company employed certain skilled help in the mechanical area at hourly rates of \$2.50 - \$2.80 for equipment operators, and \$2.50 for merchandise.



## Floating Population

Large floating populations often convey an impression of great economic activity and general well-being in a settlement. In actual fact, of the comparatively large sums attributed to the floating population, only a relatively small proportion of these seem to be recirculated in the local economy where they could contribute substantially to increased commercial and service activity, and thereby lead to increased wage-labour opportunity.

Although the amount cannot be determined precisely, certainly well over 25 per cent of the cash income of this particular segment of the population goes directly to provisioners in the south. A further undetermined but surely considerable sum rests in savings accounts also in the south, and the balance is expended in local purchases of all sorts with a part being returned to Government as rent for accommodation. With regard to rented accommodation for the largely Government-employed floating population, the Government sets rents of approximately \$111.00 for family accommodations and \$51.00 for single accommodations, essential services included.

There is no ready solution to floating populations; frequently the subject of criticism. They are absolutely essential to northern development and will remain so for a very long time; or as long as takes for the N.W.T. to build-up a substantial permanent population base with diverse skills.

## SOME ASPECTS OF THE WORK FORCES IN THE NON-PERMANENT CENTRES

For reasons that are clear, the semi-permanent centres cannot be discussed in the same context as the permanent ones. As has already been noted, they are for the most part simply isolated extensions of the southern economy and possess an economic orientation vastly different, at the present time, than was evidenced in the five permanent centres discussed previously in this chapter.

The greatest importance that can be attached to the semi-permanent centres, and hopefully additional ones to follow, lies in their contribution to the shaping of a recognizable regional economy.

The previous chapters on "population centres" and "natural resources" gave useful introductions to these development sites and went on to explain the current state of their development in relation to the resources which sustain them. For the sake of convenience it was decided to include certain data relative to the work-forces of these centres wherever it was possible to acquire them.

## TUNGSTEN

According to a personal communication received from the company, the work force would normally vary between approximately 50 and 100 individuals, depending on the season. It will be remembered that the total population varies between approximately 123 and 169 persons.

The management and supervisory staff, is normally comprised of approximately 16 salaried personnel. The remainder of the work-force consists of hourly-rated tradesmen and labourers in the following categories:

|                       |                 |                    |
|-----------------------|-----------------|--------------------|
| Machinist             | Crusherman      | Truck Driver       |
| Mechanic              | Mill Operator   | Catskiner          |
| Electrician           | Mill Trainee    | Painter            |
| Electrician Helper    | Sample Bucker   | Labourer           |
| Journeyman Pipefitter | Blaster         | Office             |
| Shovel Operator       | Serviceman      | Laboratory         |
| Grader Operator       | Shovel Oiler    | Mill Clerk         |
| Heavy Equip. Operator | Airtrac Driller | P.O. & Store Clerk |

The company places its annual operating costs with respect to salaries, wages and fringe benefits of all kinds at roughly \$ 900,000.

The several categories of the hourly-rated group were covered by an agreement concluded between the company and the United Steelworkers of America, Local 953, in November 1967. The agreement makes provision for semi-annual increases until its expiry in May 1970. For the year 1968 the agreement provided for a range of hourly rates commencing at \$3.00 for a labourer, thence through the skilled trades to a high of \$4.28 for a shovel operator. By May of 1970, these will have increased to \$3.30 and \$4.69 respectively.

A very striking difference is bound to exist between the tangible income levels achieved in a modern development centre such as Tungsten as opposed to, say, Fort Simpson. For example, the measure of income which devolves upon the total populations of either centre is roughly the same, i.e., \$900,000 vs. \$956,000, while at the same time, the populations differ by some 661 individuals.

## POINTED MOUNTAIN

Detailed information of the kind we have been discussing was not available for the Pointed Mountain development centre. Nothing was obtained in respect to wage-labour rates but the norm in the petroleum industry would certainly place these equivalent to or higher than those prevailing at Tungsten. The entire population of the site was fully employed; there being no families present. The number of people at the centre was already noted in chapter 3. A few Indians of Fort Liard were given casual employment -- but the actual number is not known.

## PRAIRIE CREEK

The work force at Prairie Creek is expected to be small at this particular stage of development and consisted of a high proportion of straight labourers, none of whom would have received less than \$550 per month including meals and accommodation.

Approximately five persons were connected with the drilling contractor's party or engaged in drifting and cross-cutting, and the balance were employed directly by Cadillac. The extreme isolation of the site is primarily responsible for a frequent turn-over in the labourer group.

## TEMPORARY CENTRES

### CAMSELL BEND

The geophysical operation "geoquest" which was mounted largely to the north of the Lower Liard Region in 1968 was staffed predominantly by technicians from locations in the south. The principal employment for local Indians and Metis was in the task of line cutting.

The number of people so employed was usually between 15 and 20 and were drawn from Wrigley and Fort Simpson. Some friction developed relative to this employment and the operation frequently found itself with too few line-cutters. One of the Fort Simpson Indians informed the author that he had worked for about two weeks at one of the camps and became disgusted with the feeding arrangements, and more particularly with the charge levied for meals.

He went on to say that many had left for the same reason and would not seek further employment with the project. Two others were interviewed and evidently had left for the same reasons. The arrangement with local help as to remuneration was \$2.25 per hour, less approximately \$7.00 per day for meals. This contrasted rather sharply with the arrangements prevailing at the Trout River site which is discussed next.

### TROUT RIVER

Trout River, at a point a few miles south from the Mackenzie River, was the approximate location of the base-camp for the Mackenzie Highway extension in the latter part of 1968.

The contractor is Western Construction & Lumber Co., Ltd. At the time of the author's visit in August, all hiring had taken place at points outside the Lower Liard Region such as Hay River, Fort Providence and others. This was perhaps unfortunate but rather understandable in the circumstances because construction was progressing from east to west. About 100 miles of bush or river separated Fort Simpson from the Trout River base-camp. Employment opportunity for Fort Simpson residents should improve as construction moves closer to the settlement.



The work-week for labourers, the positions generally filled by the Indian segment of the work-force, was usually 60 hours per week, i.e., 40 hours straight-time and 20 hours over-time. The applicable hourly rates in effect were: \$2.15 per diem for straight-time and \$3.18 for over-time. The company levied a charge of \$2.50 per diem for room and board. A labourer working a five-day week could therefore earn roughly \$150.00, less \$17.50 for room and board.

According to a communication from the company, no Indian or Metis remained on the job more than 50 days. Some indication of the turnover in these personnel is conveyed by the following summary provided by the company.

|                         |   |              |               |
|-------------------------|---|--------------|---------------|
| <u>Indian personnel</u> | 8 | remained for | 1 to 5 days   |
|                         | 4 | " "          | 5 to 10 days  |
|                         | 8 | " "          | 20 to 30 days |
|                         | 5 | " "          | 30 to 40 days |
|                         | 4 | " "          | 40 to 50 days |
|                         | 0 | " "          | over 50 days  |
| <u>Metis personnel</u>  | 2 | " "          | 5 to 10 days  |
|                         | 4 | " "          | 10 to 20 days |
|                         | 3 | " "          | 20 to 30 days |
|                         | 4 | " "          | 30 to 40 days |
|                         | 5 | " "          | over 50 days  |

From February to the end of June 1968 the wages paid to Indian and Metis employees amounted to \$ 31,500 and the company estimates that the total wages likely to be paid to these particular people over the remainder of the project will amount to approximately \$100,000. A useful proportion of this latter amount could find its way to Fort Simpson.

### SUMMARY

If one speaks of the Lower Liard Region as exhibiting a regional economic structure at this particular juncture of development in the N.W.T. then it must be considered entirely amorphous as such. Rather, the region is one in which several pockets of economic activity are discernible, none of which is dependent upon the other for economic survival.

The contrast in economic activity is only great when a comparison is attempted between any or all of the five permanent centres and the semi-permanent centre of Tungsten, which is the site of a well-developed, resource-based industry. The author submits, however, that a valid comparison cannot reasonably be drawn between the economic activities of these widely differing centres because of the circumstances peculiar to each of them.

The permanent centres named elsewhere in this report rely very heavily on Government supported wage-labour and social legislation as sources of sustained income. Trapping is of decreasing importance in the economy of the settlements and computations show that it accounted for only 7% of the total income in one centre, and nowhere did it account for more than 28% of the total income.

The per capita incomes established by the survey for the 1967/68 fiscal year relative to the permanent centres were:

#### INDIAN

| <u>Fort Liard</u> | <u>Nahanni Butte</u> | <u>Trout Lake</u> | <u>Jean Marie</u> |
|-------------------|----------------------|-------------------|-------------------|
| \$ 333            | 558                  | 336               | 555               |

#### FORT SIMPSON

| <u>Indian</u> | <u>Metis</u> | <u>White</u> | <u>Floating Population (White)</u> |
|---------------|--------------|--------------|------------------------------------|
| \$ 739        | 903          | 1797         | 2011                               |

Certain qualifying statements are included in the text concerning the per capita income for Nahanni Butte and Trout Lake which, in 1967/68, were much higher than normal due to extraordinarily high sums spent on public works projects by the Government.

Selected per capita incomes across the country as reported by the D.B.S. (catalogue 13-201 - 1967) were as follows:

| <u>Newfoundland</u> | <u>New Brunswick</u> | <u>Yukon &amp; N.W.T.</u> | <u>Ontario</u> | <u>British Columbia</u> |
|---------------------|----------------------|---------------------------|----------------|-------------------------|
| \$ 1,424            | 1,658                | 1,795                     | 2,624          | 2,579                   |

The aggregate strength of the labour force in the permanent centres, treating only Indians and Metis of both sexes between the ages of 16 - 65, was males 244, females 210 which, when taken together, represented a potential of 111,230 man-days. Utilization of this force during 1967/68 amounted to 24,634 man-days on wage-labour pursuits, or roughly only 22% of the available potential in the two ethnic groups.

Perhaps the most striking feature of economic activity in the Lower Liard Region is afforded by the realization that over approximately the past eight years about \$65,000,000 have been injected into the region by private companies, and to a lesser degree the Government, as investment in resource oriented projects, with virtually a negligible effect on economic improvement in the permanent centres.





## CHAPTER 7

### POTENTIAL FOR ECONOMIC GROWTH

#### INTRODUCTION

Perhaps nothing is of more importance, when considering economic potential in the Lower Liard Region, than the full realization that the region is so aligned physically and economically to northern British Columbia as to form an integral part of the greater Fort Nelson economic region. A subordinate alignment with the Great Slave region does occur along the northern fringe of the study area but mainly influences Fort Simpson and Jean Marie. This is a phenomenon of traditional trade routes which may undergo drastic change as southbound, transportation infrastructures emerge.

Having identified here, and elsewhere in the text of the report, this predominant alignment of the bulk of the Lower Liard Region with northern B.C., it would be desirable also to recognize a partitioning within the study region itself.

This partitioning, on grounds of geography, natural resources and the probable positioning of transportation routes in the Lower Liard Region, was noted by Pfeffer (1962) when he drew attention to the disadvantageous location of Fort Simpson in relation to the known major resources, and wherein he also noted the influence of the Backbone Ranges of the Mackenzie Mountains on access to certain parts of the region.

For the foreseeable future at least, a threefold division of the region is likely to remain. Economic developments west of the Backbone Ranges will have their access to and from British Columbia through the south-eastern part of Yukon; developments south of Fort Simpson, including much of the valley of the South Nahanni River, will have their preferred access and egress via Fort Nelson B.C., but will have a less desirable alternate routing to the east via Hay River; and lastly, Fort Simpson will have the distinction of sitting approximately astride the junction of north-south arteries with the termination of their east-west counterparts.

This junction will be equidistant, within a very few miles, of Edmonton via either Fort Nelson or Hay River. (approximately 850 miles by roads either existing, under construction, or planned)

It would be convenient, for the present, to refer to the areas resulting from this partitioning as the Tungsten, Fort Liard and Fort Simpson areas. The economic future of both the Tungsten and Fort Liard areas may be equated directly with their natural resource potential and that of the Fort Simpson area with activities in the central and Lower Mackenzie to which it is the gateway.

The discovery of important mineral resource potential in close proximity to Fort Simpson in the future could introduce considerable change in its role as implied in this introduction but, in the absence of such discoveries, Fort Simpson or its vicinity, is apt to emerge more as a secondary marshalling and distribution centre for inbound and outbound freight to and from the Lower Mackenzie and a staging point for passenger traffic.

As well, the Government of N.W.T. following transfer of the bulk of the Federal Government investment in Fort Simpson to N.W.T. jurisdiction, will probably continue to use Fort Simpson as its chief administrative centre for much of the Lower Liard Region, thereby preserving the current status quo of the settlement, for a while at least.

### NATURAL RESOURCES

This section is concerned with a brief review of the known major resources in the Lower Liard Region, particularly with regard to their economic potential. It should be obvious that quantitative potentials are largely unknown in many facets of the resource spectrum and, moreover, it is possible to infer monetary equivalents of potential only in the light of today's values.

One of the objectives of this chapter is to arrive at a priority-time category for the resources by eliminating those that would not, or would not appear to be viable in the existing circumstances of demand, lack of transportation and the like. An effort will also be made to show to what extent the development of certain resources is likely to contribute to economic growth within the study region; chiefly with regard to employment opportunity for the resident Indians.

#### Fauna

The principal use of this resource in the study region has traditionally figured in the production of wild furs. For many years the fauna resources have been substantially underexploited, both in the two trapping areas depicted in map 8, and in terms of additional territory beyond those same areas which is not exploited at all.

Few would doubt that income from trapping could perhaps be doubted by more intensive harvesting but to do so effectively would involve financial support of a magnitude transcending reasonable limits; in view of the rather limited benefits that would likely accrue. The kind of support alluded to, here, would involve air lifts for trappers and necessary price supports for raw furs. Either incentive would probably have to be invoked for the whole of the Territories and likely for the entire country as well, wherever the harvesting of wild furs plays as useful a role in income.

Some idea of the futility of inducements of these kinds is perhaps best afforded by examples of the magnitude of values received by the producers of wild furs. The value of wild furs produced in N.W.T. has not exceeded \$2 million since 1951, and only in nine of the nearly fifty years since 1920 did the annual value in fact surpass the amount. Finally, only in one of those nine good years did the value ever reach \$3 million.

Barring quite spectacular price increase for raw furs, it would take incentives of the kind mentioned earlier to bring about a significant increase in production. A significant increase might reasonably be four or five times the value of current N.W.T. production, \$1,374,532 (D.B.S. 1966/67)

Considerations which do not appear in the foregoing, but which nevertheless serve to militate against an improvement in the exploitation of this resource, are: the actual and pending improvements in native housing and increasing settlement amenities; readily available social assistance; increasing opportunity for employment in less arduous pursuits; increasing emphasis on education, and many others.

Notwithstanding the apparent declining importance of fur harvesting in the economy, it does enjoy an economic history continuous over some 169 years in parts of the Lower Liard Region. There is no reason to suppose that it will not continue to serve as a valuable source of supplementary income for many Indian families; more particularly those who cannot, for one reason or another, take advantage of wage-labour opportunity within or without the study region.

In conclusion, the author has difficulty in visualizing anything greater than a minimal contribution to economic growth from this particular natural resource.

### Merchantable Forests

These forests, which are confined largely to Forest Area "A" as shown in map 11, contain about 2 billion board feet of softwood species; mainly white spruce suitable for the production of lumber. This measure includes only those trees with a diameter of 10 inches or greater at breast height.

The forests may lend themselves to a combination of lumber and pulp production, in which event remaining softwood species with a diameter of from 4 to 9 inches are estimated to have a volume in excess of 1 million cunits, and hardwood species with a diameter of 4 inches and over have an estimated volume of about 6 million cunits.



The high demand and price on the export market for spruce lumber will, according to the Forest Products Division of Department of Trade and Commerce, probably be sustained for many years by rising consumption. In these conditions, the prime spruce stands in Forest Area "A" should be utilized in the production of lumber and complemented, if practicable, by a pulp operation to utilize other than prime stands of both soft and hard-wood species.<sup>1</sup>

Spruce lumber is an important export item in the national economy, as is clear from the following data communicated by the Department of Trade & Commerce: Canada, in 1967, exported about 2.061 billion board feet at an export price of \$147,910,000 while in 1968, approximately 2.603 billion board feet were exported for a return of \$225,738,000.

The principal producer of interior white spruce is British Columbia which in 1967 produced 1.835 billion board feet. About 80% of that quantity was included for export in the 1967 total for all Canada, as noted in the preceding paragraph. The favourable market has brought the less accessible forests within economic limits of exploitation and, because of this, the Fort Nelson Region, and its appendage the Lower Liard Region, are advanced to a position of immediate importance with regard to exploitable timber reserves.

Given improvements in transportation routes already in the offing, i.e., connecting road between Fort Nelson and Fort Simpson and the extension of the railway from Fort St. John to Fort Nelson already announced publicly by the Government of British Columbia, Forest Area "A" could be placed in production within three to five years.

Based on the 1968 export price of approximately \$86.70 per 1000 board feet, Forest Area "A" would appear to have a potential value of about \$130,500,000 in lumber alone at prices current in 1968. In this connection it is of passing interest to recognize the minimal protection provided for a natural resource so valuable and at the same time so susceptible to destruction by fire.

---

<sup>1</sup>

Palmer (1969: p. 1) says "In terms of roundwood requirements, the lumber industry will continue to place the heaviest demand upon the Province's forest resource. The proportion of total log production accruing to the saw-mill sector is expected to decline by 1975 as the more rapidly expanding pulp, paper and plywood industries take increasingly larger volumes of wood. However, in the 1975-85 period, it is forecast that this trend will be reversed and the lumber industry's cut will rise slightly." Palmer was referring to the B.C. industry. The long term prospect, however, would appear also to favour lumbering in the Lower Liard.

The Swanson Lumber Co. Ltd. supplied the author with the broad details of a modest size lumbering operation in Forest Area "A" which is summarized as follows:

Three, modern portable saw-mills would be positioned between the 60th parallel and Nahanni Butte, the approximate northern limit of Forest Area "A". Fort Liard would become the service centre for the whole of the operating area. A finishing mill would necessarily be located at the rail-head in Fort Nelson, B.C.

The initial investment in equipment would approximate \$1,000,000 and annual production was estimated at approximately 25 million board feet.

The company claimed that the forests could not be economically exploited without the establishment of a rail-head at Fort Nelson, and that an all-weather road to Fort Nelson although a highly desirable adjunct was not essential to exploitation. The implication is that the key rests with the railhead, making it possible to utilize the forests economically in advance of highway completion by using existing or extendable winter roads for haulage.

The company has had a successful history of operations in the Sweetgrass area of Wood Buffalo National Park, N.W.T. and views the Lower Liard Region as one of immediate interest. Its experience in the former area is used as a model later in this chapter in discussing the employment potential of this renewable resource.

#### Arable Land

As deforestation proceeds in the Lower Liard Region, it would be possible to progressively clear and break roughly 1.1 million acres of arable land for agricultural pursuits, chiefly cattle-raising.

In spite of this seemingly attractive prospect and its undoubted potential for agricultural production, agriculture is not apt to contribute on a significant scale to economic growth in the study region perhaps for decades.

Some of the reasoning for this conclusion is based on - the lack of an adequate market for agricultural products in the area, or in the Mackenzie District as a whole; high freight-rates and the absence of a well developed transport infrastructure in respect to the large southern markets, and a generally rising surplus of agricultural products in the country. To these could be added the absence of a cadre of experienced farmers, ranchers and hands in the Lower Liard Region.

Agriculture, whatever the role it may be asked to play in the economy of the future, will have to be equated at that time with the productive potential of the approximately 1.4 million acres of arable land in the Slave River Lowlands to the east with which, in theory at least, it would have to compete. The Lowlands have some important advantages over the Lower Liard which lend themselves to an earlier development for agricultural purposes.

Chief among these are the proximity to a larger area-market, and the comparatively large expanses of natural open meadows for pasturing. Virtually all of the arable land in the Lower Liard would have to be cleared, broken and seeded before intensive management practices could be introduced to achieve maximum production. Clearing in the vicinity of Fort Simpson has cost between 60 - 80 dollars per acre (Day 1966 p. 62). However, clearing occurred while trees were in situ. Following deforestation, as would be the case in the Lower Liard, clearing would primarily involve stumping. Clearing in these circumstances would be more expensive, probably increasing to between 80 - 125 dollars per acre.

A very comprehensive and highly informative survey by the Department of Agriculture concerning beef-raising in the Slave River Lowlands was brought to completion in 1968; having been initiated following a request from D.I.A.N.D. In this study the Department of Agriculture rationalized the prospects for agriculture in the Slave River Lowlands in terms of the N.W.T. and southern markets, transportation, capital investment, difficulties being faced by agriculture in other areas of Canada, agricultural surpluses and the like. The weight of evidence led the study group to conclude that no sound basis for recommending agricultural development of the Slave River Lowlands exists at the present time.

However inadvertently, the report of the study group automatically relegates agricultural development in the Lower Liard Region much behind that of the Slave River Lowlands for the present.

Regarding productive potential, the study group demonstrated that the Slave River Lowlands, with intensive management practices, is capable of supporting in the order of 300,000 beef cattle. It would be reasonable to assume, therefore, that the Lower Liard Region, with similar soils, better climate but roughly 21% less area, might be capable of supporting perhaps 275,000 beef cattle.<sup>1</sup>

---

<sup>1</sup> The relationship between market and land capability with respect to the beef-production was rather well demonstrated by the study group which showed that, based on the Mackenzie District population of 18,685 in 1966, only 840,000 pounds of beef would be required annually. This amount could be obtained from the slaughter of 1,700 animals from a herd of 4,900. The estimate assumed a per capita consumption of 45 pounds. Doubling the per capita consumption, and the population as well, would require a herd of about 21,000 head permitting the slaughter of about 7,300 cattle. Even the latter condition would represent less than 15% utilization of land capability, or carrying capacity for beef raising.



The ability of soils in the study region, particularly those of the Liard Series, to produce vegetables is one aspect of agriculture which could be made to contribute substantially to family incomes through the production of potatoes and other hardy vegetables for consumption in the home. A lumbering operation in the region, coupled to developments in the production of natural gas and tourism, could create a market for vegetables produced by one or more small truck farms in appropriate localities in the Fort Liard area.

The Indian population which would stand to benefit most from endeavours of this kind are, unfortunately, the ones least inclined to show initiative in agricultural pursuits even of this limited kind. Efforts of D.I.A.N.D. and Department of Agriculture, along with living examples of crop raising by the Catholic Mission, and the Experimental Farm at Fort Simpson and numerous individuals, have together failed to inspire the kind of results with kitchen gardens that one might expect in the region. It is the more perplexing when we find a staple like potatoes frequently selling at \$18.00 per cwt., and being wholly acceptable to recipients of social assistance as a desirable item of food.

### Water

Fresh water is, for itself, one more natural resource likely to be relegated to the distant future in terms of its economic potential, in the context of this discussion.

At the time agricultural development proceeds water will become valuable in irrigation, which is almost certain to be required in getting maximum production from some of the land in the study region. Also, its possible sale in the future to water-hungry parts of the Prairie Provinces and U.S.A. should perhaps be contemplated. Elsewhere in the report reference was made to the large amounts of fresh water discharged from the Lower Liard Region at Fort Simpson. (approximately 270 billion acre feet per annum)

Some indirect economic potential exists for fresh water in the region. For example, the hydro-electric power potential of the South Nahanni River and, at the same time, the considerable potential of its valley as the site of a national park are both predicated on water. The potential in both spheres is currently receiving the close attention of the authorities.<sup>1</sup>

---

<sup>1</sup> In the summer of 1969 two branches of interest in D.I.A.N.D. will be carrying out simultaneous but independent studies concerned with hydro-electric power development on the one hand, and national parks development on the other. These intended uses are almost diametrically opposed to each other.

Sulphuretted waters which occur as thermal springs, principally in the valley of the South Nahanni River, possess an inherent economic worth as an appendage of a national park. They will, however, require a modest investment for their improvement.

### Minerals

#### Metallic

The only measurable potential so far known in the Lower Liard Region is that of the Canada Tungsten Mine at Tungsten, N.W.T. The partitioning of the Lower Liard Region demonstrates that the operation contributes not to the economy of the study region proper but rather to the economy of the Fort Nelson region; in larger measure to the economy of Vancouver, B.C., and in useful measure to the national economy through the export of its principal production, tungsten, to the U.S.A.

The potential for economic growth in metallic mineral production will naturally lie with the uncovering and developing of new deposits; not only of tungsten ores but of lead-zinc-silver and copper, the occurrence of which is widespread in the region. Means of access is the primary requirement throughout the general area(s) of mineralization and is probably the greatest impediment to a closer look at the full potential of this resource.

Referring again to the Canada Tungsten Mine, the life of the present deposit may be estimated at approximately seven years from the end of 1967. This is based on the estimated milling rate and ore reserves placed at 919,917 tons at the end of 1965 (Green 1965: p. 85).

The value of 1968 production was not available but the year was an important one for the mine because it was the first in which the mill operated without interruption from some cause or other. The Financial Post Survey of Mines (1968: p. 103) reports the value of 1965 production at \$928,715 from the milling of 107,651 tons of ore grading 2.53%  $\text{WO}_3$ .

The company has a contract covering its tungsten production and is actively engaged in exploration to uncover additional deposits of scheelite needed to extend the life of the operation. Mineralization of the pertinent kind is by no means absent in the immediate vicinity and the chances of turning up additional mill-feed within economic hauling distances are considered good.

### Hydrocarbon

#### Natural Gas

This resource will likely prove of minimal worth to economic growth in the study region itself. It is however of rapidly increasing importance in the economy of the Fort Nelson area where it will undoubtedly give rise to additional, specialized auxiliary industries concerned with gas treatment and the like. Its place in the national economy is too well known to warrant repeating here.

Exploration for additional, natural gas potential will probably continue in the Lower Liard Region for many years, and it is this particular stage of natural gas development that makes a direct contribution to local economies within the region. The actual extent to which exploration might contribute to economic growth will depend upon the advantage taken of the opportunities afforded. A useful indication of the approximate amounts of money expended in certain phases of exploration are provided in another section of this chapter.

In 1968, natural gas in the study region was properly spoken of as "potential". This was because none of the fields were in actual production. However, according to the Oil & Gas Administration, D. I. A. N. D. , the Pan American Petroleum Corp. and Westcoast Transmission Co. have concluded a contract for the supply of Pan American's partially developed gas reserves at Pointed Mountain, N. W. T. and also those at Beaver River, B. C.

The output from both pools is to be fed into a 20 inch pipeline extended northward from Fort Nelson. Delivery is contemplated at an average daily rate of 70 million cubic feet by November 1969, increasing to an average daily rate of 150 million cubic feet one year later.

The actual proportions to be drawn from each pool, or the reserves of either, could not be determined, but present reserves at Pointed Mountain are thought sufficient to meet its contractual obligations for at least twenty-five years.

If, for the sake of discussion, we assume that the pools will supply gas in equal proportions, and also that the gas will sell for about \$0.15 per M cubic feet, then production from the Pointed Mountain pool during the first year would have an approximate value of \$1.9 million, and a value of approximately \$4.1 annually thereafter.

### National & Territorial Park Sites

#### National

A part of the valley of the South Nahanni River constitutes a natural resource which could be made to contribute substantially to economic growth through the establishment of a national park. It is important to economic growth, however, that such a park be established primarily as one with considerable appeal to a large cross-section of the tourist public. This is opposed to those national parks the establishment of which is predicated rather on their being preserves for the enjoyment of future generations, and in which facilities for interior movement are not particularly well developed.

A park can satisfy both needs, but provision should be made to arrange for reasonable access for large numbers of tourists to visit whatever outstanding features the park has to offer, otherwise its full potential contribution to the economy will not be realized.



Park boundaries must be so placed as not to unnecessarily preclude the development of other resources which could contribute to economic growth as well. The particular attractions of the South Nahanni site are closely associated with the river itself and lend themselves to the creation of a park of narrow corridor design, thereby freeing the bulk of the basin for mineral exploration and development. The park could be contained in a corridor with an average width of about three or four miles at most, centered on the river and stretching from Glacier Lake to the Liard River at Nahanni Butte.

It is doubtful if reserves placed beyond the corridor would serve any useful purpose in the long-run, but they could conceivably interfere with worthwhile mineral development.

A park development would draw virtually all of its visitors from the Alaska Highway at Fort Nelson, once the road link from the latter location was extended northward. It is difficult to visualize traffic wishing to route itself over the particularly monotonous route north from Edmonton, thence via Hay River and Fort Simpson, to visit a park with its entrance located at Nahanni Butte.

Apart from considerations of routing, the economic potential of the park will depend upon the services provided within its confines, particularly river transportation and the range and quality of the privately operated service industries which would naturally spring up near the park entrance.

Usually it is a part of official procedure to commission an "economic impact study" in advance of park development. This has not been done for the Nahanni so far, but when it is, many of the economic factors will be properly identified and more fully examined.

It is not the object of the present report to anticipate what might emerge from an impact study, but some discussion and hypotheses are probably desirable at this time, regardless of how inaccurate they might ultimately be proved to have been.

A like study carried out by H.G. Acres (1968) for the Bloodvein park-site, Manitoba, estimated an initial (first year) capital expenditure by the Government of \$750,000. As both the Bloodvein and Nahanni sites are primarily potential river parks, the amount estimated for Bloodvein might tentatively be applied unadjusted to the Nahanni site. The study estimated further that 40% of the initial capital expenditure would accrue to local labour as wages.

The study, unfortunately, was not commissioned to project expenditures for subsequent years of operation, but we might assume that the initial expenditure referred to would be sufficient to establish a service centre and perhaps three or four camp-sites at the Nahanni site, and that the annual expenditure in the years immediately following would approximate \$150,000 for

the upkeep, maintenance, additional construction, and administration. Roads will not be an in-park requirement for the Nahanni site so this is a normally large capital expenditure not exceeding consideration.

As the key to the success of a park at Nahanni would appear to be equated with tourist traffic on the Alaska Highway, bound for Yukon and/or Alaska, data pertinent to Yukon would have best application in estimating the magnitude of the tourist reservoir from which the Nahanni Park would draw its visitors.

D. W. Carr (1968 vol. 4) estimates that at the present growth rate of about 11.9% per annum, probably 125,000 tourists visited Yukon in 1968. This estimate was based on a previously estimated 100,000 visitors in 1966. By 1970 the number will theoretically have approached nearly 150,000.

The same study shows that about 95% arrived by car and that 81% of all visitors were from the U.S.A. As it is possible to arrive in Alaska by car-carrying ferry, then proceed to Yukon, it can safely be assumed that at least 50% arrived on the Alaska Highway via Fort Nelson. In 1970, therefore, about 70,000 tourists might be expected to pass at Fort Nelson to destinations in Yukon and/or Alaska.

To carry the hypothesis further, the assumption is made that at least 10% of that tourist body could be attracted to the Nahanni Park for an average of 2.5 days; a round-trip road distance of approximately 300 miles. This means that in the early years of the park perhaps 17,500 tourist-days might reasonably be anticipated annually.

Carr (1968 vol. 4: p. 139) states that the average tourist party (approx. 3 persons) in 1966 was estimated to have spent nearly \$30 per party day distributed as follows: transportation (car) 50%; accommodation 14%; food 25% and miscellaneous 11%. In arriving at probable on-site expenditure by the tourists at Nahanni it would not seem fair to apply 50% of the daily expenditure to car transportation because only gasoline for the 150 mile return journey from Nahanni to Fort Nelson would be expended on the site. However, as river transportation would be an essential adjunct of the park, the \$30 per day might be left undisturbed in its construction and amount. Moreover, because the \$30 was arrived at through a study carried out in 1966, it should perhaps be increased to \$36 per party day to bring it more into line with 1969/70 costs.

Through the foregoing hypothesis it seems reasonable to suggest that on-site expenditures for 17,500 tourist-days in 1970 might amount to approximately \$210,000 and that such a volume could reasonably be looked for in the early years of the park's life. A steady increase in tourist traffic to the park in subsequent years seems virtually assured.

## Territorial

A number of potential park sites have been indicated by the survey and appear in their locations on companion map 7. These sites represent a resource of economic potential, but their development is perhaps too distant to warrant further discussion; except perhaps to conclude that the Federal and Territorial Governments should investigate them with a view to fixing protective reservations for possible future development.

## PRIORITY/TIME CATEGORY FOR NATURAL RESOURCES

In trying to isolate those resources which would best serve economic growth in the study region, one is immediately faced with the prospect of formulating an order keyed to employment opportunity for the Indian population.

In that context, labour-intensive, primary resource-based industry holds the best promise of growth for the Lower Liard Region for some years to come. For perhaps the next ten years, the natural resources of the region should command attention in the following order: (1) merchantable forests; (2) national park; (3) natural gas; (4) metallic minerals (5) fauna.

If, on the other hand, one were to view the natural resources of the study region in the context of their order of importance to the economy of the greater Fort Nelson economic region, then a rather different order might emerge. For example; (1) natural gas; (2) merchantable forests (3) metallic minerals (4) national park, and fauna barely at all.

The grander national economy stands to be augmented by the development of any of the resources because all except national parks which, itself, brings in needed foreign exchange, are strongly export oriented.

Obviously priority/time arrangements are very flexible things sensitive to events which sometimes defy even national control. Emphasis on one or the other will, therefore, change from time to time regardless of what one might think best for the study region itself.

## ECONOMIC IMPLICATIONS FOR THE PERMANENT POPULATION CENTRES

A fallacy of area economic surveys is that their authors are not given sufficient latitude to consider the broader economic settings in which study regions are frequently situated. This holds especially true for those regions of N. W. T. lying close to the common political boundaries with the Provinces and may give rise to preconceived notions that potential for economic development can properly be fostered independent of influences from adjoining regions or important nearby centres.



If one must indicate a growth centre for the Lower Liard Region at this time then the choice is unmistakably Fort Nelson, B. C. No substitute centre presently appears to exist to the north of it.

Simply by reason of its geographic location, Fort Nelson stands to become a principal beneficiary of most natural resource developments in the study region; particularly in the sphere of secondary industry. This pattern is already established for natural gas and might be expected to emerge for other resources as well.

Such recognition should be considered positive for the study region and may perhaps suggest circumstances for more orderly and logical steps toward development than could reasonably be achieved by attempting to view the Lower Liard Region in any other perspective.

There are very real and important economic implications for certain of the permanent centres in the Lower Liard, chiefly in the sphere of employment for the Indian peoples, and is with this critical aspect of economic growth within the Lower Liard that the balance of the chapter is concerned. The greater emphasis naturally devolves upon the Fort Liard area.

### Employment Opportunity

#### Merchantable Forests

Projections for this resource must be based on the most applicable experience; namely, that of the Swanson Lumber Co. at Sweetgrass, supplemented by direct discussions with officers of that company concerning a model operation in Forest Area "A" of the study region. Only a lumbering operation is considered by the report, but should it prove feasible to combine a lumbering with a pulp operation, then the economic prospects for the Fort Liard area would improve more substantially from the improved exploitation of the merchantable forests.

The Swanson Lumber Co. estimated that a work-force of approximately 125 persons would be required for the seasonal requirements of logging and the operation of three saw-mills. The annual pay-roll was estimated at roughly \$500,000.

The Sweetgrass venture reached an optimum level of employment after several years of operation, following which the work-force had an Indian/Metis component of nearly 82%. Many of the skilled and supervisory positions were filled by these people. The Liard operation would, however, probably begin with a 1 : 1 ratio of Indian/Metis vs. White content and gradually build to a 5 : 1 ratio with experience.

It would seem reasonable to expect, therefore, that the Indian work-force in the Lower Liard would build from roughly 60 to 100 individuals, representing a cash injection into the local economy of about \$200,000, rising eventually to \$380,000 annually.

The effect of a service centre for the operation being established at Fort Liard is not immediately clear, but would certainly offer some opportunity for employment in respect to a fuel agency, accommodation, meals, laundering services, vehicle maintenance, building maintenance and clerical occupations.

### National Park

If the Nahanni park is developed, and the indications are that it will be, then some rather interesting opportunities for employment would arise. And because a national park is a very long-term proposition, such a development in the Lower Liard Region would, like lumbering, generate considerable economic stability through a broadening of the economic base.

Areas of labour opportunity for the local populace are shown in their direct and indirect relationship to the park.

### National Park

#### Government of Sector years 1 & 2

Initial Clearing of Camp Sites  
Construction of Service Centre  
Construction of Fuel Depots &  
Park Maintenance Cabins  
  
Construction of Trails  
  
2 years +  
Maintenance & Upkeep of Park  
Additional Construction

#### Private Sector years 2-10

Service Station & Garage  
Motel(s)  
Restaurant(s)  
Craft Centre  
Laundry & Cleaning  
General Store  
Guide Services  
River Transport

It may be more realistic to spread the initial capital expenditure of the \$750,000 noted earlier over two years rather than one year as was estimated for the Bloodvein Park, and assume that maintenance and upkeep would continue thereafter at about \$150,000 annually for several years.

Acres (1968: p.36) uses a factor of 49% in calculating local labour content, but indicates a range of 24% to 40% experienced by the U.S. National Park Service. To be conservative the author chooses 35% as the labour-factor of expenditure by the Government.

In the Government sector, therefore, the first two years of development could inject about \$131,250 into the local economy annually in wage-labour for local residents, chiefly the Indian peoples of the region. In subsequent years, the cash injection in terms of local labour is more apt to be about \$52,500 or less.

To summarize for the Government sector, 81 local males could be employed for the months of June through September in each of the two initial years, and about 32 for the same period in each of the years immediately following.<sup>1</sup>

No allowance is made at this time for a winter caretaker cadre which would be required for the service centre.

The on-site expenditure of tourists, which was presumed earlier to be roughly \$210,000, would have subtracted from it about \$12,000 in park and camp-site fees, with the balance being expended on the local service industries. A relatively large amount, perhaps 35% to 50%, would likely be spent on river transportation; the only practical means of surface transport to the park interior.<sup>2</sup>

Carr (1968: p. 133), citing various studies pertaining to employment in service industries oriented to tourism, shows an average of six summer employees per establishment. Being more conservative with the Nahanni park, the author assumes three employees for each of the service industries indicated previously, with the exception of guiding and river transport which are assigned six each. All are considered employees additional to the proprietors.

Five of the service industries would employ, or could employ, all women, making a total of 15 for an expenditure on wages approximating \$21,000. The remaining three service industries could employ about 15 local males, for an estimated \$42,500 in wages.<sup>3</sup>

---

<sup>1</sup> Eighty work days of eight hours each were estimated for the summer period June through September. An average labouring wage of \$2.50 per hour was assumed to be realistic for the area in 1970.

<sup>2</sup> Park entrance fee \$2.00 per party - camping fee \$1.50 per party per night.

<sup>3</sup> In the case of female employees totalling 15, the average rate used was \$1.50 per hour and the work base was 120 days. Male employees at the service station were rated at an average hourly rate of \$2.75 on a similar base. Guides and river transport operators were rated at an average hourly rate of \$3.00 on a base of 120 days. The day length used was eight hours.



Provided all service industries were established and operating, the local wage content of the previously estimated expenditures by tourists could amount to roughly \$63,500 for the period June through September, employing about 30 local residents. Normally, service industries would remain open a full week and the season would, therefore, amount to approximately 120 days.

### Natural Gas

The only aspect of natural gas development apt to contribute in any way to economic growth in the Lower Liard Region is that of exploration and well-site preparation. When a well is deemed a potential producer, or is abandoned employment opportunity becomes negligible or is absent altogether.

It is of interest to note also that when a well or group of wells become produce they are in no wise labour intensive. For example, the Pointed Mountain pool which presently consists of two potential producing wells, with the prospect of two more being added, would employ six to eight persons, none of whom are likely to be Indians.

As the gas processing facility will almost assuredly be placed in Fort Nelson, where some treatment capacity already exists, there is little prospect of a plant of this kind being established in the Lower Liard Region. If, however, gas should be discovered in the Fort Simpson area, a processing plant would probably be required nearby to remove impurities before transmission to the south. A plant of this kind would contribute importantly to economic growth in the region, but the possibility is too remote for further consideration just now.

Referring again to the earlier stages of well development, expenditures by petroleum companies range approximately between \$.5 million and \$5 million to bring a well to the point where it becomes a potential producer or is abandoned. This is about the experience in the Lower Liard Region. Considerable employment opportunity for local residents is inherent in the following distribution of expenditure over tasks.

|   |     |
|---|-----|
| 1. Exploration - geology, seismology, etc.  | 5%  |
| 2. Well drilling costs - includes equipment costs, freight, rig and camp moves associated with the site | 82% |
| 3. Construction of roads, bridges and airstrip  | 9%  |
| 4. Rig and camp moves unassociated with the site  | 4%  |

Data Source: Petroleum company active in the region (unnamed by request)

---

<sup>1</sup> This estimate naturally entails more than drilling and includes, besides roads and bridges, certain permanent installations.

The principal areas of interest for local residents are stages 1 and 3, which offer line-cutting and general labour tasks. Some residents of Fort Liard have in the past made limited use of this potential but it remains very much underexploited. Fort Simpson residents have taken much better advantage of this type of exploration activity in their area, but not always successfully.

The author cannot be specific about the numbers that could be employed by the several companies who will be active in the region in the next few years. But many similar exploration projects will be launched and it is only reasonable to assume that the companies would be pleased to engage optimum numbers of reliable and hard-working local people because it would be to their advantage to do so. It is the quality of the labour force which is basically at fault and more will be said about this later.

### Metallic Minerals

The effects of metallic mineral development if it occurs will probably be felt most at Fort Simpson and perhaps at Nahanni Butte. The present pattern of exploration is concentrated west and south-west of Fort Simpson, in an area whose access and egress would be from and to the east, respectively. Of the four permit areas shown on map 12 Fort Simpson would be the focal point for three of them, and Nahanni Butte for the fourth.

Mining exploration would be of very limited interest as a source of employment opportunity for local peoples, but any step toward exploitation would hold considerable promise. If we consider the Canada Tungsten mine at Tungsten, N.W.T. as being an operation of about minimum size, then it is easy to see that the industry is labour-intensive and could be made a substantial contributor to economic growth in the study region.

Using the Tungsten operation as a model, it would be safe to assume that about twenty positions at least could be filled by Indian peoples. And many more could be filled with successful training and improved attitudes toward work.

### Other Labour-Intensive Developments

The principal consideration under this heading is road construction. The experience of Western Construction & Lumber Co. Ltd. on the Mackenzie Highway extension from Hay River to Fort Simpson ought not be studied only in terms of the income potential for local residents. The company estimated about \$100,000 would be paid out, or was available, to Indian and Metis labourers, but the experience of the company forces particular attention to the pronounced inability of these people to remain on the job for usefully long periods.

As route construction approaches, or leads away from, Fort Simpson, Nahanni Butte and Fort Liard, work opportunity for the residents of the study region will rise sharply. In the case of the southern route from B.C. border to Fort Simpson, employment opportunity will remain for several years. Using current construction as a datum, and assuming contractual arrangements and road specifications will be about the same, the route from the border to Fort Simpson will require about six years to complete.

On the strength of Western Construction & Lumber Co. data, upwards of \$300,000 could be available over six years as wages to Indians/Metis peoples. This amount is additional to the approximately \$100,000 available for the same purpose in respect to the completion of the Hay River/Fort Simpson route from mile 229 to 286.

The planned expansion of communication facilities by Canadian National Telecommunications in 1970 should produce additional work opportunities for local residents. Primarily, the requirement is one of tower construction and means of access; probably short access roads, needing a limited amount of general labour.

#### IMPLICATIONS FOR THE INDIAN POPULATIONS

The implications for the Indians of the Lower Liard Region could be of unprecedented opportunity for general economic and social advancement, not duplicable in most of N.W.T., and in some other parts of Canada as well.

Conservatively speaking, the next few years could produce new job opportunities with an aggregate value to Indian wage workers in the general range of from \$300,000 to \$600,000 annually. Excluded are the contributions which could result from opportunities almost certainly to arise as a result of exploration for hydrocarbons.

To be considered along with those sums would be the recirculation factor, or that proportion of income which would be spent locally on services and merchandise of all kinds. The study shows that there was a recirculation factor of 70% for Nahanni Butte in the fiscal year 1967/68. Unfortunately, all of this found its way into purchases of merchandise which resulted in little or no local employment for native people. The recirculation factor applicable to the earnings of a White floating-population which might emerge as a result of developments discussed previously is expected to be considerably less as a percentage, but is very apt to benefit the local population to a greater extent through the hiring of local people for a wide variety of services.

All of the opportunities discussed previously in the spheres of natural resource and route construction will occur within the study region itself and, in this regard, could not be better situated for a people with the low labour-mobility characteristics possessed by the Indian residents of the region.



Concomitant developments in the Fort Nelson area can be counted on in the future to offer formidable, additional employment opportunities for those Indians of the Lower Liard prepared to go there.

In spite of the impressive prospects for socio-economic improvement in the next few years, the enigma remains that: it is one thing to be in the midst of opportunity and quite another thing to exploit it.

The hard facts of economic development today demand a disciplined labour force, but a majority of the Indians are either not able or inclined to nearly fulfill that requirement. In this context, the most universally undesirable trait encountered by the experience of private companies, and, in spite of its different role, that of the government itself, alludes not the Indians' ability to practice or acquire skills, but rather to their lack of personal responsibility relative to job and employer.

The solution to this situation will lie increasingly with the Indian himself, and, through a fuller recognition of its importance, with the educators. On the whole, private industry has demonstrated responsibility and sympathy to the problem, but has perhaps received less official support than should be forthcoming in view of some of the special circumstances associated with the employment of Indians.

In conclusion, an opportunity will present itself in the next few years for comparatively large numbers of Indians to be gainfully employed in seasonal but long term wage-employment categories. Considerable planning and preparation will have to be done in advance of opportunity in order to achieve employment for optimum numbers of the available labour force.

## SUMMARY

The Lower Liard Region has been viewed by the author in what he feels is the proper perspective; namely, as a region with upcoming economic growth of substantial magnitude, without a prospective growth centre of its own but comfortably within the economic orbit of Fort Nelson - unmistakably a growth centre with very considerable economic potential and influence.

A threefold partitioning of the Lower Liard Region emerges and is readily divisible into three areas, i.e., Tungsten, Fort Liard and Fort Simpson.

The Fort Liard area, which may be roughly defined as that area between the 60th parallel to slightly north of Nahanni Butte, including the park corridor of the South Nahanni valley and east to Trout Lake, contains within its limits virtually all of the known, major natural resources identified in the region. This fact, and its proximity to Fort Nelson, make it the area of greatest interest for the present.

The Fort Simpson area, or at least that part of it within the survey area, includes part of the north side of the South Nahanni River basin and stretches easterly along the northern fringe of the survey area. Its focal point is the settlement of Fort Simpson.

It cannot be said that Fort Simpson is in the midst of known, major natural resources but its approximate location with regard to existing and proposed commercial supply routes point up factors of economic interest.

Unfortunately, it is a greater truth in the north than elsewhere that approximate locations are often too removed for optimum results. In this context the present location of Fort Simpson may very well prove economically untenable and could disappear through attrition in favour of a settlement developing near the junction of north-south with east-west arterial roads, or at a more northerly point on Cap Gras.

Of all the natural resources identified in the Lower Liard Region two are of special interest because, external conditions are right for their development; they are labour intensive although seasonal; they are complementary and, finally, their long term life would contribute substantially to economic stability in the Fort Liard area.

Their timely development is predicated not only on the speed with which arterial roads are constructed, but perhaps also on the point of departure selected for construction.

Mineral exploration and road construction will probably contribute substantially to the economy for several years, but are not apt to be sustained over long periods.

Arable land for agriculture purposes, and fresh water, are resources for the distant future. Agriculture, however, could be made to contribute usefully to the family economy if approached with purpose and seriousness.

Fauna might be expected to continue its decline in economic importance; particularly as a result of changing attitudes of the younger people, the generally poor returns obtained from harvesting and the rising preference for wage labour among all Indians of employable age.

The Indian people must bring about a very considerable improvement in certain of their attitudes, particularly in the sphere of employee responsibility in wage-labour, otherwise optimum employment levels will not be achieved and, at the same time, opportunities will progressively diminish through increased competition from other ethnic groups.

Finally, the prospects for secondary industries in the Lower Liard Region must be considered negligible for some years at least; unless the government proposes subsidizing them to the point they are able to compete effectively with more favourably located industries to the south. The prospects for the development of services industries are infinitely better and would be more in keeping with the bases for economic growth in the region over the next several years.





## CONCLUSIONS & RECOMMENDATIONS

### CONCLUSIONS

The conclusions resulting from the study are implicit in the text of each chapter and/or the companion summaries. However, it is perhaps desirable to attach additional emphasis to at least four of them which appear to be rather basic to achieving a rational socio-economic growth and climate.

Firstly, the evidence is overpowering in support of the view that the study region is economically an essential part of the Fort Nelson Region, with whose economic future rests the prospects for growth in the Lower Liard. No other perspective seems logical in view of existing and probable economic patterns. Once having recognized this peculiarity of the Lower Liard, it is easier to visualize expanded mutually-beneficial cooperation from both sides of the political boundary in many spheres of socio-economic endeavour.

Secondly, the study region is rather unique in N.W.T. in that it possesses a broad spectrum of natural resources, particularly renewable resources, that allow an order to be established for their timely development as optimum economic conditions present themselves. The renewable resources particularly, but not necessarily exclusively, could lead to a diversified economic base promising considerable economic stability over a long period.

Thirdly, an unparalleled opportunity exists at present, and in advance of an impending acceleration in economic activity, to prepare a large number of Indians in the potential labour-force for up-coming opportunities requiring a wide and interesting range of skills. If a plan is not devised to achieve that objective then the prospects for the Indian population will quickly revert to the familiar one of crisis in the midst of opportunity.

Lastly, a costly arrangement of population centres is present in the region, only one of which is nearly well-located with respect to resource potential and emerging land routes. That one is Fort Liard. Further contributions to the permanency of any of the remainder are almost certain to multiply the problems of eventual relocation which it is difficult to realize cannot fail to come about. Experience elsewhere in N.W.T. has demonstrated that poorly located settlements seldom disappear of their own accord and become increasingly more costly to maintain.

### RECOMMENDATIONS

The theme underlying the recommendations is based on the proposition that it would be desirable to strive for rational economic growth through planning and preparation in advance of impending economic development. The rather

considerable potential of the Lower Liard Region is suited to development targets of substantial magnitude and of great importance to the socio-economic improvement of comparatively large numbers of Indians. In view of these particular circumstances, the launching of scattered small projects for the benefit of the Indian people will have to be more carefully weighed. These are sometimes of doubtful viability and frequently benefit only a few - very often at considerable expense in energy, time and money.

It is recommended that:

- 1)   a) In consultation with the Government of British Columbia, every avenue be re-examined with a view to expediting the construction of a road from Fort Nelson to a crossing-point on the 60th parallel.
- b) Fort Liard be selected as the departure point for construction of the priority leg of the N.W.T. connecting route to the 60th parallel for the purposes of saving time and demonstrating an urgent interest in the early completion of the B.C. section of the route.
- c) The point of departure for the northward extension of the route within N.W.T. should, again, be Fort Liard.
- 2) Consideration be given to the formation of a permanent committee, representative of the Forts Nelson-Liard economic region for the purpose of weighing economic problems and prospects of mutual interest. The representation should naturally include the three principal Governments, local authorities and groups, and locally-based industry. The inter-dependence on resource potential and transport routes makes for a situation in which much mutually beneficial cooperation could be brought to bear on the composite region; in spite of the dividing political boundary along the 60th parallel.
- 3) Investment on a commercial scale not be encouraged in those resources for which the timing of development appears unquestionably distant and, for that reason, prone to failure at the present time. There is strong suggestion, for example, that beef-raising should not be encouraged for the present, and it seems equally appropriate and timely to suggest that small, community saw-mill operations in prime forests be discouraged whenever proposed.
- 4) The fire-control responsibilities of the Mackenzie Forest Service be greatly expanded to include as priority areas: (1) the entire limits of Forest Area "A" (2) the forested areas within, and adjacent to, the "corridor" of the proposed Nahanni Park; and also that an aerial surveillance be considered essential for some parts of the priority areas and fire-fighting delivery systems be vastly improved.



- 5)
  - a) A comprehensive plan be devised immediately with the object of achieving a sound preparation of a part of the Indian labour-force to supply the labour and skills likely to be required in the developing economy over the next several years. The survey suggest that the Lower Liard Region offers a rare opportunity to develop a demonstration model for N.W.T. and elsewhere with regard to successfully establishing comparatively large numbers of Indians in a close economic community.
  - b) The closest possible consultation and cooperation of locally-based, or potentially locally-based, private industry be sought relative to the execution of certain pertinent aspects of such a plan. (a)
  - c) A proper Employment Service be set up in the region to take full advantage of existing employment opportunity. Prime requisites of the Service would be: a classification of the performance and skills of the labour force; close liaison with actual or prospective employers; a continuing responsibility of the Service to both employer and employee, etc.
- 6) Consideration be given to the relocation of Nahanni Butte settlement from the left to the right side of the Liard River, as near to its junction with the South Nahanni River as engineering specifications for site selection will reasonably permit; and that all capital expenditures contemplated for land improvements or additional buildings be curtailed pending an examination of the evidence supporting relocation.
- 7) All capital expenditures contemplated for land improvements, buildings, utilities, etc. for Trout Lake be curtailed pending an examination of the possible grounds for encouraging a migration of the resident population to Fort Liard, Nahanni Butte, or perhaps both.
- 8) The present location of Fort Simpson be re-examined, again, in the light of emerging transportation arteries featuring their principal junction near the Cap Gras Headland, between the Liard and Mackenzie Rivers, and the likelihood of their future northern extension favouring the right bank of the Mackenzie River opposite Fort Simpson. The examination should consider the effects of a possible attrition on the present settlement, caused by a new centre blossoming anywhere between the road junction and the Mackenzie River.
- 9) Encouragement be given to the Jean Marie Indians to relocate at Fort Liard or Nahanni Butte whenever a commercial lumbering operation appears imminent in Forest Area "A".

- 10) Land reservations be placed on all road junctions pending the formulation of a sound building code and zoning regulations for sites bordering on highways.
- 11) Land reservations be placed on all the potential Territorial Park sites indicated elsewhere in the report until the government of N.W.T. has examined its future requirements for same.

In conclusion, the author submits that the Lower Liard Region warrants the formulation of a comprehensive master plan for socio-economic development at an early date. It is hoped that some of the recommendations of this report will be found worthy of consideration, but there exists an urgent need of detailed studies in several specialized fields.

# REFERENCES

- Acres, H. G. & Co.                      An Economic Impact Study of the Proposed Bloodvein National Park, National & Historic Parks Branch, D.I.A.N.D. , Ottawa, 1968
- Baker, W. M.                              Prospects for National Parks Development in Parts of the Yukon and N. W. T. , National & Historic Parks Branch, D.I.A.N.D. , Ottawa, 1963
- Bostock, H. S.                            Physiography of the Canadian Cordillera With Special Reference to the Area North of the Fifty-Fifth Parallel, Geological Survey of Canada, Ottawa, 1948
- Brandon, L. V.                            Groundwater Hydrology and Water Supply in the District of Mackenzie, Yukon Territory and Adjoining Parts of British Columbia, Geological Survey of Canada, Ottawa, 1965
- Carr, D. W. & Assoc.                    The Yukon Economy, Vol's 3 & 4, D.I.A.N.D. and the Government of Yukon Territory, Ottawa, 1968
- Chin, W. Q. H.                            Interim Report on a Power Investigation of the South Nahanni River, N. W. T. , Water Resources Branch (Internal Report) 1962
- Cohen, Ronald                            An Anthropological Survey of Communities in the the Mackenzie - Slave Lake Region of Canada, Northern Coordination and Research Centre, D. I. A. N. D. , Ottawa, 1962
- Day, J. H.                                  Reconnaissance Soil Survey of the Lower Liard Valley, N. W. T. , Research Branch, Canada Dept. Agriculture, Ottawa, 1966
- Douglas, R. J. W. & Norris, D. K.    Virginia Falls and Sibbeston Lake Map Area, Paper 60-19, Geological Survey of Canada, Ottawa, 1960
- Douglas, R. J. W. & Norris, D. K.    Camsell Bend and Root River Map Areas, Paper 61-13, Geological Survey of Canada, Ottawa, 1961
- Douglas, R. J. W. & Norris, D. K.    Fort Liard and LaBiche Map Areas, Paper 59-6, Geological Survey of Canada, Ottawa, 1959



- Douglas, R. J. W. , Norris, D. K. Thorsteinson, R. and Tozer, E. T. Geology and Petroleum Potentialities of Northern Canada, Geological Survey of Canada, Ottawa, 1963
- Finlay, D. C. The Mineral Industry of Yukon Territory and Southwestern District of Mackenzie, Geological Survey of Canada, Ottawa, 1967
- Gabrielse, H. , Roddick, J. A. , and Blusson, S. L. Flat River, Glacier Lake and Wrigley Lake Map Areas, Geological Survey of Canada, Paper 64-52, Ottawa, 1965
- G. S. C. Geology and Economic Minerals of Canada, Economic Geology Series No. 1, Geological Survey of Canada, 1963
- Green, L. H. The Mineral Industry of Yukon Territory and Southwestern District of Mackenzie, Geological Survey of Canada, Ottawa, 1964
- Green, L. H. The Mineral Industry of Yukon Territory and Southwestern District of Mackenzie, Geological Survey of Canada, Ottawa, 1965
- Hirvonen, R. P. Report on the Forest Conditions in the Lower Liard River Basin, Yukon/Northwest Territories, Forest Management Institute, Dept. of Forestry & Rural Development, Ottawa, 1968
- Jenness, Diamond Indians of Canada, National Museum of Canada, Ottawa, 1955
- Lesage, Rev. Father S. Sacred Heart Mission, A Historical Sketch 1858 - 1958, Catholic Mission, Fort Simpson, 1958
- Pfeffer, H. W. A Study of the Economic Potential of Fort Simpson and the Surrounding Area, Economic Division, D. I. A. N. D. , Ottawa, 1962 (an internal report)
- Palmer, Bayard, W. J. The British Columbia Forest Industry Forecast to 1975 and 1985, Bureau of Economic & Statistics, Dept. of Industrial Development, Trade & Commerce Victoria, B. C. (a paper delivered to the Economic Outlook Conference, 1969)
- Nowosad, F. S. , Day, J. H. , Cody, W. J. , Looman, J. , Stutt, R. A. and Philpotts L. E. Report on the Potential of the Slave River Lowlands for Agriculture and the Feasibility of Developing a Viable Cattle Ranching Industry in the Area, Research Branch, Canada Dept. Agriculture, Ottawa, 1968 (an internal report)

Table 1. — Vegetation Types in the Recent Floodplains

|                         | TREE LAYER   | UNDERWOOD LAYER  | SHRUB LAYER   | HERB LAYER   |
|-------------------------|--|--|---|--|
| Sandbars and riverbanks | —  | —  | Low density; willow.  | Low density; horsetail, spruce seedlings, grasses, black poplar seedlings, willow seedlings. |
| Riparian shrub          | —  | 10-30 feet high, dense; black poplar, willow, alder.                                 | 3-4 feet high, sometimes absent, sparse; black poplar, alder, rose.                 | —  |
| Depressional shrub      | —  | —  | —   | 1-2 feet high, generally sparse; horsetail, spruce seedlings, grasses, currant, raspberry.   |
| Black poplar forest     | Up to and over 100 feet high, generally dense; mainly black poplar, some white spruce. | 20-30 feet high, generally dense; black poplar, alder, some white spruce and willow. | 2-5 feet high, generally dense; alder, rose, red osier dogwood.                     | 1-2 feet high, dense; horsetail, some grass, raspberry.                                      |
| White spruce forest     | Up to and over 100 feet, generally dense; white spruce, some black poplar, birch.      | 15-25 feet high, generally dense; white spruce, birch, alder, some willow.           | 3-5 feet high, generally dense; alder, rose, red osier dogwood, highbush cranberry. | 1-2 feet high, generally dense; horsetail, raspberry, bunchberry.                            |
| Brulé                   | —  | 15-25 feet high, generally dense; black poplar, willow, birch, alder.                | 2-4 feet high, dense; alder, raspberry, rose, highbush cranberry.                   | 1-2 feet high, generally dense; horsetail, grass, raspberry.                                 |

Table 2. — Vegetation Types in the Older Floodplains and Terraces

|                                    | TREE LAYER  | UNDERWOOD LAYER  | SHRUB LAYER   | HERB LAYER   |
|------------------------------------|---|--|---|--|
| Mixedwood forest                   | Up to 100 feet high, often dense; white spruce, aspen.  | 15-20 feet high, density variable; willow, birch, alder. | 2-4 feet high, density variable; rose, highbush cranberry.                            | Up to 1 foot high, density variable; miterwort, raspberry, bunchberry, twinflower.     |
| Mixed broadleaved forest           | Up to and above 100 feet high, density variable; black poplar, aspen, birch.                        | 10-25 feet high, density very variable; birch, alder.    | 2-4 feet high, usually very dense; alder, rose, highbush cranberry.                   | Up to 1 foot high, usually rather dense; raspberry, bunchberry, twinflower.            |
| Black spruce — larch — moss forest | Never more than 30 feet high, often much less, density variable, usually open; larch, black spruce. | —  | 1-3 feet high, density very variable; larch, black spruce, dwarf birch, Labrador tea. | Less than 1 foot, generally dense; mosses, lichens, cloudberry, alpine bearberry.      |
| Meadow                             | —   | —  | 2-4 feet high, dense; sedge and grass.  | —  |
| Brulé                              | Usually 20-30 feet high, often dense, but variable; aspen, willow, birch.                           | —  | 3-5 feet high, often dense but variable; white spruce, rose, bunchberry, squashberry. | 1-2 feet high, usually very dense; horsetail, grass, fireweed, red currant, raspberry. |



SSB Fort Liard to Outside World Via  
Hay River Toll Centre

For AM and SSB(HF) radio calls to long distance toll networks, a rate applies of \$0.75 for an initial period of three minutes or fraction thereof with an overtime rate of \$0.25 per additional minute or fraction thereof, plus person day long distance rates.

Initial 3 Minute Rate Only

|                                 | <u>Initial Radio Rate</u> |                      | <u>Initial L/D rate</u> |                      |
|---------------------------------|---------------------------|----------------------|-------------------------|----------------------|
|                                 | To Radio Terminal         |                      |                         |                      |
|                                 | Rate                      | Each Addt'l.<br>Min. | Person to<br>Person     | Each Addt'l.<br>Min. |
| Ft. Simpson to Edmonton, Alta.  | \$0.75                    | \$0.25               | \$3.80                  | \$0.85               |
| Ft. Simpson to Calgary, Alta.   | \$0.75                    | \$0.25               | \$4.05                  | \$0.90               |
| Ft. Simpson to Vancouver, B.C.  | \$0.75                    | \$0.25               | \$2.30                  | \$0.50               |
|                                 |                           |                      | \$3.90                  | \$0.70               |
| Total                           | \$0.75                    | \$0.25               | \$6.20                  | \$1.20               |
| Ft. Simpson to Saskatoon, Sask. | \$0.75                    | \$0.25               | \$2.30                  | \$0.50               |
|                                 |                           |                      | \$3.45                  | \$0.60               |
| Total                           | \$0.75                    | \$0.25               | \$5.75                  | \$1.10               |
| Ft. Simpson to Winnipeg, Man.   | \$0.75                    | \$0.25               | \$2.30                  | \$0.50               |
|                                 |                           |                      | \$4.40                  | \$0.75               |
| Total                           | \$0.75                    | \$0.25               | \$6.70                  | \$1.25               |

Data Source: Canadian National Telecommunications, Edmonton.

Initial 3 Minute Rate Only

|                              | <u>Initial Radio Rate</u> |                              | <u>Initial L/D Rate</u>     |                              |
|------------------------------|---------------------------|------------------------------|-----------------------------|------------------------------|
|                              | <u>To Radio Terminal</u>  |                              |                             |                              |
|                              | <u>Rate</u>               | <u>Each Addt'l.<br/>Min.</u> | <u>Person to<br/>Person</u> | <u>Each Addt'l.<br/>Min.</u> |
| Ft. Simpson - Toronto, Ont.  | \$0.75                    | \$0.25                       | \$2.30                      | \$0.50                       |
|                              |                           |                              | \$5.35                      | \$0.95                       |
| Total                        | \$0.75                    | \$0.25                       | \$7.65                      | \$1.45                       |
| Ft. Simpson - Montreal, Que. | \$0.75                    | \$0.25                       | \$2.30                      | \$0.50                       |
|                              |                           |                              | \$5.35                      | \$0.95                       |
| Total                        | \$0.75                    | \$0.25                       | \$7.65                      | \$1.45                       |

SSB Fort Liard to Outside World Via  
Fort Nelson Toll Centre

|                                |        |        |        |        |
|--------------------------------|--------|--------|--------|--------|
| Ft. Simpson to Calgary, Alta.  | \$0.75 | \$0.25 | \$2.20 | \$0.50 |
|                                |        |        | \$2.85 | \$0.60 |
| Total                          | \$0.75 | \$0.25 | \$5.05 | \$1.10 |
| Ft. Simpson to Edmonton, Alta. | \$0.75 | \$0.25 | \$2.20 | \$0.50 |
|                                |        |        | \$2.50 | \$0.55 |
| Total                          | \$0.75 | \$0.25 | \$4.70 | \$1.05 |
| Ft. Simpson to Vancouver, B.C. | \$0.75 | \$0.25 | \$2.20 | \$0.50 |
|                                |        |        | \$3.05 | \$0.65 |
| Total                          | \$0.75 | \$0.25 | \$5.25 | \$1.15 |

SSB Fort Liard to Outside World Via  
Fort Nelson Toll Centre

| <u>Initial 3 Minute Rate Only</u> |                           |                              |                             |                              |
|-----------------------------------|---------------------------|------------------------------|-----------------------------|------------------------------|
|                                   | <u>Initial Radio Rate</u> |                              | <u>Initial L/D Rate</u>     |                              |
|                                   | <u>To Radio Terminal</u>  |                              |                             |                              |
|                                   | <u>Rate</u>               | <u>Each Addt'l.<br/>Min.</u> | <u>Person to<br/>Person</u> | <u>Each Addt'l.<br/>Min.</u> |
| Ft. Simpson to Saskatoon, Sask.   | \$0.75                    | \$0.25                       | \$2.20                      | \$0.50                       |
|                                   |                           |                              | \$3.45                      | \$0.60                       |
| Total                             | \$0.75                    | \$0.25                       | \$5.65                      | \$1.10                       |
| Ft. Simpson to Winnipeg, Man.     | \$0.75                    | \$0.25                       | \$2.20                      | \$0.50                       |
|                                   |                           |                              | \$4.40                      | \$0.75                       |
| Total                             | \$0.75                    | \$0.25                       | \$6.60                      | \$1.25                       |
| Ft. Simpson to Toronto, Ont.      | \$0.75                    | \$0.25                       | \$2.20                      | \$0.50                       |
|                                   |                           |                              | \$5.35                      | \$0.95                       |
| Total                             | \$0.75                    | \$0.25                       | \$7.55                      | \$1.45                       |
| Ft. Simpson to Montreal, P.Q.     | \$0.75                    | \$0.25                       | \$2.20                      | \$0.50                       |
|                                   |                           |                              | \$5.35                      | \$0.95                       |
| Total                             | \$0.75                    | \$0.25                       | \$7.55                      | \$1.45                       |



FORT SIMPSON, N.W.T.

## RATE

|   | Day (Except Sunday) |                        |                         | Night & Sundays    |                        |                         |
|---|---------------------|------------------------|-------------------------|--------------------|------------------------|-------------------------|
|   | Initial 3 Min.      |                        |                         | Initial 3 Min.     |                        |                         |
|   | Stn.<br>to<br>Stn.  | Person<br>to<br>Person | Each<br>Addt'l.<br>Min. | Stn.<br>to<br>Stn. | Person<br>to<br>Person | Each<br>Addt'l.<br>Min. |
| Ft. Simpson - Edmonton,<br>Alta. - NWT Rate Table | 2.55                | 3.80                   | .85                     | 1.90               | 2.85                   | .60                     |
| Ft. Simpson - Calgary                             | 2.70                | 4.05                   | .90                     | 2.00               | 3.05                   | .65                     |
| Ft. Simpson - Vancouver,<br>B.C.                  | 1.55                | 2.30                   | .50                     | 1.15               | 1.75                   | .35                     |
|   | 2.10                | 3.90                   | .70                     | 1.70               | 3.15                   | .55                     |
| Total   | 3.65                | 6.20                   | 1.20                    | 2.85               | 4.90                   | .90                     |
| Ft. Simpson - Saskatoon,<br>Sask.                 | 1.55                | 2.30                   | .50                     | 1.15               | 1.75                   | .35                     |
|   | 1.85                | 3.45                   | .60                     | 1.50               | 2.90                   | .50                     |
| Total   | 3.40                | 5.75                   | 1.10                    | 2.65               | 4.65                   | .85                     |
| Ft. Simpson - Winnipeg,<br>Man.                   | 1.55                | 2.30                   | .50                     | 1.15               | 1.75                   | .35                     |
|   | 2.35                | 4.40                   | .75                     | 1.80               | 3.70                   | .60                     |
| Total   | 3.90                | 6.70                   | 1.25                    | 2.95               | 5.45                   | .95                     |
| Ft. Simpson - Toronto,<br>Ont.                    | 1.55                | 2.30                   | .50                     | 1.15               | 1.75                   | .35                     |
|   | 2.85                | 5.35                   | .95                     | 1.95               | 4.50                   | .65                     |
| Total   | 4.40                | 7.65                   | 1.45                    | 3.10               | 6.25                   | 1.00                    |
| Ft. Simpson - Montreal,<br>P.Q.                   | 1.55                | 2.30                   | .50                     | 1.15               | 1.75                   | .35                     |
|   | 2.85                | 5.35                   | .95                     | 1.95               | 4.50                   | .65                     |
| Total   | 4.40                | 7.65                   | 1.45                    | 3.10               | 6.25                   | 1.00                    |

BARGING EQUIPMENTNORTHERN TRANSPORTATION COMPANY

The Northern Transportation Company operates out of its marshalling area in the old town of Hay River, and from there moves tonages along the south shore of Great Slave Lake and thence down the Mackenzie River to the Arctic Coast. The company's equipment in 1968 was as follows:

| <u>Barges</u>                    | <u>Capacity</u>      |
|----------------------------------|----------------------|
| 2 - 800 series 175' x 50' x 7'6" | 850 tons at 5' draft |
| 2 - 700 " 155' x 45' x 7'6"      | 700 " " 5' "         |
| 26 - 600 " 150' x 35' x 7'6"     | 600 " " 5' " (1)     |
| 23 - 400 " 120' x 30' x 7'6"     | 375 " " 5' "         |
| 3 - 450 " 120' x 30' x 7'6"      | 375 " " 5' " (2)     |

Tugs

|                    |   |             |   |                                     |
|--------------------|---|-------------|---|-------------------------------------|
| Radium Yellowknife | - | twin diesel | - | 1500 HP                             |
| Radium Charles     | - | "           | " | "                                   |
| Radium Dew         | - | "           | " | "                                   |
| Pelican Rapids     | - | "           | " | 1000 HP                             |
| N. T. Marjorie     | - | "           | " | 800 HP                              |
| N. T. Richard      | - | "           | " | " (used mostly on Great Slave Lake) |

Equipment Under Construction for 1969 SeasonBarges

|    |   |                   |
|----|---|-------------------|
| 10 | - | 200' x 50' x 7'6" |
|----|---|-------------------|

Tugs

|   |             |         |
|---|-------------|---------|
| 2 | twin diesel | 4000 HP |
|---|-------------|---------|

When the water in the Mackenzie River is low, loading must be to a four foot draft only. This introduces about a 20% reduction in carrying capacity of the barges.

(1) These barges are multipurpose design - for fuel or general cargo

(2) Used for bulk gasoline only



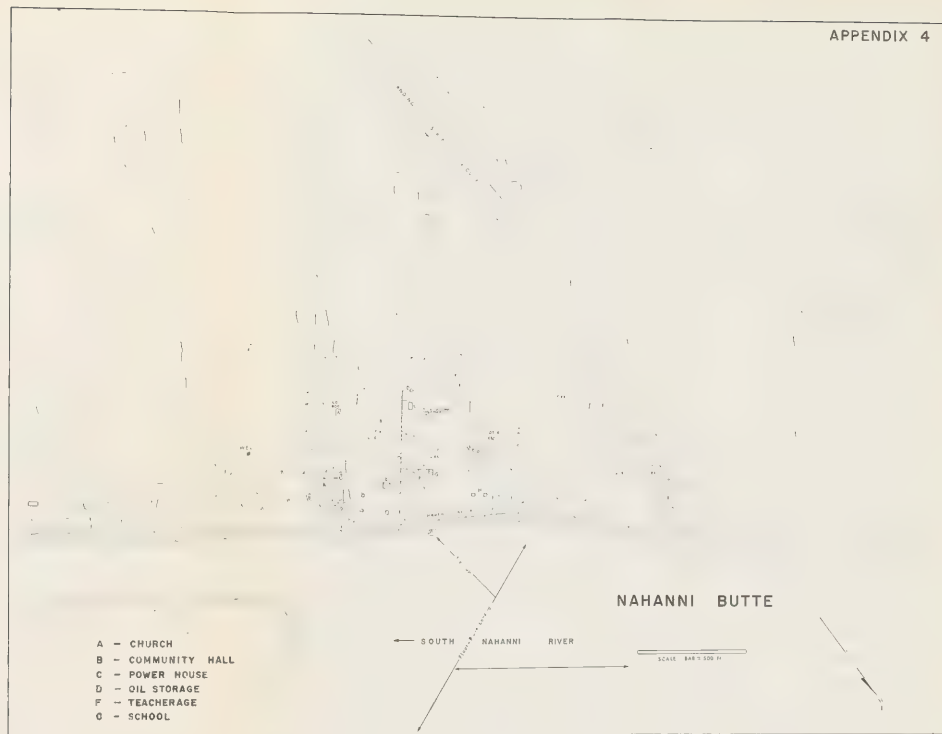


- A - CHURCH
- F - SCHOOL
- G - FOREST SERVICE
- I - R.C.M.P.
- P - POWER HOUSE



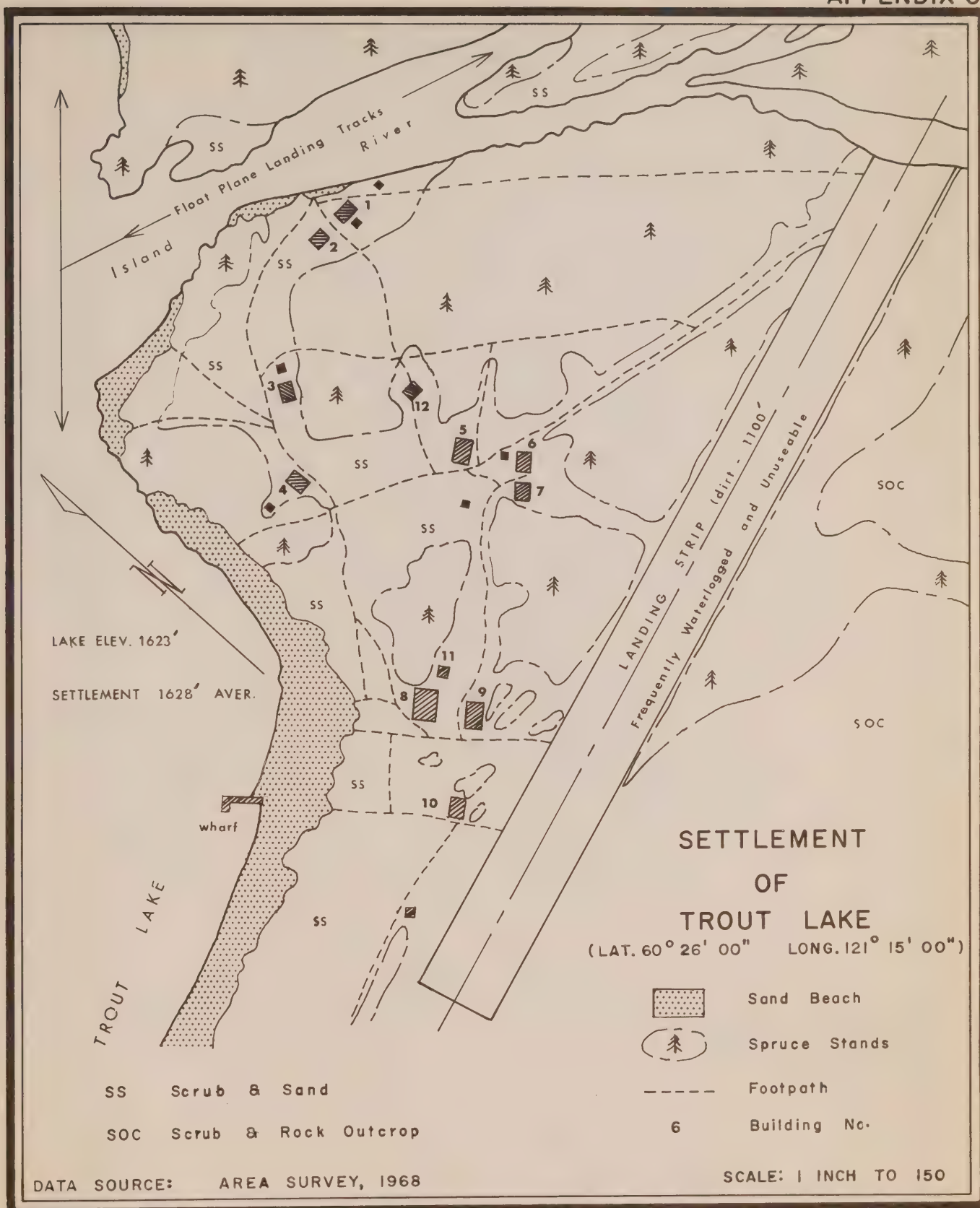
FORT LIARD



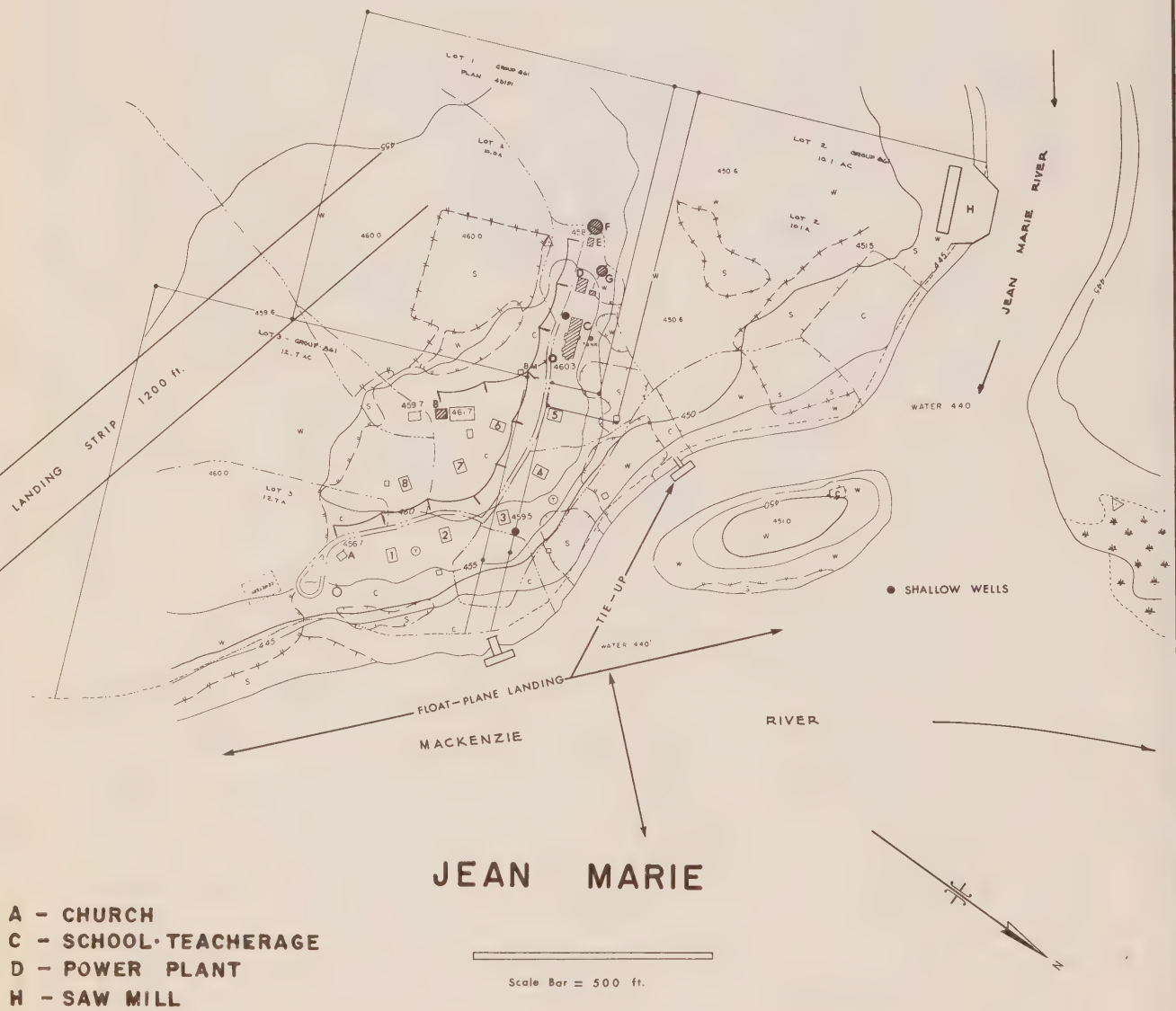








## APPENDIX 6



FORT SIMPSON



EQUIPMENT AVAILABLE TO SIMPSON CONSTRUCTION LTD.FORT SIMPSON

Caterpillar, D-7, 17A with winch

" D-4, 7U with over-head

" No. 12, Road Grader

Scraper, w/unit

Road Grader, Galion, 101

Wheel Loader, 1½ yd., Trojan

International Harvester, F-1800, Tandem Truck (2)

" " B-20, 4 x 4, 3/4 ton Truck

" " A-160, 3 ton Dump Truck

" " S-184, Winch Truck, with poles

" " D-1200, 4 x 4, 3/4 ton Truck

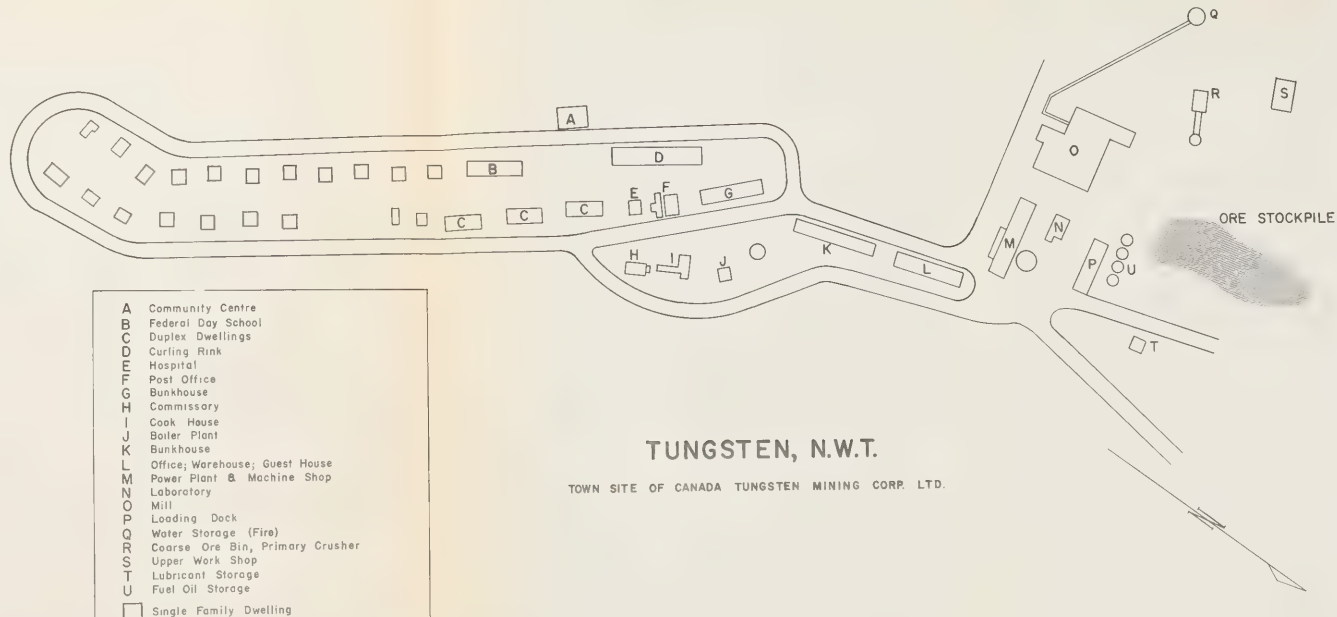
" " B-120, 4 x 4 Panel Truck

" " A-120, 4 x 4 Panel Truck

Portable Electric Welders, 400 amps. and 250 amps. (2)

Repair Garages, with tools and parts inventory, 80' x 40' & 28' x 32'





SCALE APPROX. 1 INCH = 150 FEET



Area A - Lower Liard River - 60th Parallel to Blackstone River

Summary of Area and Volume for Mature Cover Types

| Cover Type      | Area in '00 Acres | Softwood <sup>1</sup> |         |             | Hardwood <sup>2</sup> |         |
|-----------------|-------------------|-----------------------|---------|-------------|-----------------------|---------|
|                 |                   | M Cunits              |         | Million fbm | M Cunits              |         |
|                 |                   | 4 - 9"                | 10" +   | 10" +       | 4 - 9"                | 10" +   |
| 3S1             | 97                | 45.6                  | 55.3    | 16.7        | 3.8                   | -       |
| 3S2             | 156               | 64.4                  | 169.7   | 38.6        | 25.1                  | 12.1    |
| 3S3             | 4                 | 1.8                   | 6.7     | 1.0         | -                     | -       |
| 4S1             | 75                | 24.0                  | 244.5   | 141.4       | 11.3                  | 40.5    |
| 4S2             | 141               | 27.9                  | 484.5   | 274.2       | 18.6                  | 114.5   |
| 5S3             | 46                | 28.3                  | 133.0   | 66.2        | 9.4                   | 4.4     |
| 5S2             | 4                 | .7                    | 16.8    | 9.7         | -                     | 6.7     |
| Total Softwood  | 523               | 212.7                 | 1,110.5 | 547.8       | 68.2                  | 178.2   |
| 3M1             | 918               | 175.3                 | 753.7   | 157.9       | 62.4                  | -       |
| 3M2             | 652               | 468.8                 | 340.4   | 112.9       | 132.4                 | 193.0   |
| 3M3             | 84                | 30.7                  | 47.5    | 12.0        | 46.2                  | 54.5    |
| 4M1             | 121               | 35.7                  | 302.6   | 183.1       | 28.2                  | 165.9   |
| 4M2             | 145               | 37.7                  | 312.8   | 188.9       | 37.7                  | 365.8   |
| 4M3             | 474               | 257.4                 | 1,190.2 | 682.7       | 132.7                 | 585.8   |
| 4M4             | 19                | 12.4                  | 57.3    | 42.8        | 6.4                   | 28.4    |
| 5M2             | 26                | 4.1                   | 62.7    | 36.8        | 1.8                   | 79.5    |
| 5M3             | 1                 | .2                    | 3.0     | 1.9         | .1                    | 3.9     |
| Total Mixedwood | 2,440             | 1,022.3               | 3,070.2 | 1,419.0     | 447.9                 | 1,476.8 |
| 3H1             | 685               | 57.6                  | 58.2    | 26.7        | 327.4                 | 296.6   |
| 3H2             | 647               | 59.5                  | 55.6    | 28.6        | 683.2                 | 327.4   |
| 3H3             | 298               | 67.7                  | 89.1    | 30.7        | 287.9                 | 190.1   |
| 3H4             | 14                | 1.9                   | .6      | .6          | 18.9                  | 14.4    |
| 4H1             | 80                | 7.8                   | 53.0    | 36.0        | 33.1                  | 220.5   |
| 4H2             | 192               | 49.7                  | 111.7   | 7.1         | 100.8                 | 622.8   |
| 4H3             | 291               | 91.9                  | 140.0   | 79.1        | 195.6                 | 678.3   |
| 4H4             | 59                | 21.4                  | 53.5    | 43.7        | 43.5                  | 206.2   |
| 5H1             | 15                | -                     | 2.3     | 1.2         | 1.6                   | 76.9    |
| 5H2             | 17                | 1.9                   | 24.7    | 13.6        | .1                    | 75.3    |
| 5H3             | 18                | 2.9                   | 18.6    | 10.7        | .8                    | 99.5    |
| Total Hardwood  | 2,316             | 362.3                 | 607.3   | 278.0       | 1,692.9               | 2,808.0 |
| Grand Total     | 5,279             | 1,597.3               | 4,788.0 | 2,244.8     | 2,209.0               | 4,463.0 |

Area B - Lower Liard River - Blackstone River to Fort Simpson

Summary of Area and Volume for Mature Cover Types

| Cover Type      | Area in '00 Acres | Softwood <sup>1</sup> |       |             | Hardwood <sup>2</sup> |       |
|-----------------|-------------------|-----------------------|-------|-------------|-----------------------|-------|
|                 |                   | M Cunits              |       | Million fbm | M Cunits              |       |
|                 |                   | 4 - 9"                | 10" + | 10" +       | 4 - 9"                | 10" + |
| 3S1             | 36                | 16.9                  | 20.5  | 6.2         | 1.4                   | -     |
| 3S2             | 13                | 5.4                   | 14.1  | 3.2         | 2.1                   | 1.0   |
| 3S3             | -                 | -                     | -     | -           | -                     | -     |
| 4S1             | -                 | -                     | -     | -           | -                     | -     |
| 4S2             | 15                | 51.6                  | 51.6  | 29.2        | 2.0                   | 12.2  |
| 4S3             | -                 | -                     | -     | -           | -                     | -     |
| 5S2             | -                 | -                     | -     | -           | -                     | -     |
| Total Softwood  | 64                | 27.4                  | 86.2  | 38.6        | 5.5                   | 13.2  |
| 3M1             | 231               | 44.1                  | 189.6 | 39.7        | 15.7                  | -     |
| 3M2             | 108               | 77.7                  | 56.4  | 18.7        | 21.9                  | 32.0  |
| 3M3             | 2                 | .7                    | 1.1   | .3          | 1.1                   | 1.3   |
| 4M1             | -                 | -                     | -     | -           | -                     | -     |
| 4M2             | 5                 | 1.3                   | 10.8  | 6.5         | 1.3                   | 12.6  |
| 4M3             | -                 | -                     | -     | -           | -                     | -     |
| 4M4             | -                 | -                     | -     | -           | -                     | -     |
| 5M2             | -                 | -                     | -     | -           | -                     | -     |
| 5M3             | -                 | -                     | -     | -           | -                     | -     |
| Total Mixedwood | 346               | 123.8                 | 257.9 | 65.2        | 40.0                  | 46.9  |
| 3H1             | 64                | 5.4                   | 5.4   | 2.5         | 30.6                  | 27.7  |
| 3H2             | 9                 | .8                    | .8    | .4          | 9.5                   | 4.5   |
| 3H3             | -                 | -                     | -     | -           | -                     | -     |
| 3H4             | -                 | -                     | -     | -           | -                     | -     |
| 4H1             | -                 | -                     | -     | -           | -                     | -     |
| 4H2             | 15                | 3.9                   | 8.7   | .5          | 7.9                   | 48.7  |
| 4H3             | -                 | -                     | -     | -           | -                     | -     |
| 4H4             | -                 | -                     | -     | -           | -                     | -     |
| 5H1             | -                 | -                     | -     | -           | -                     | -     |
| 5H2             | -                 | -                     | -     | -           | -                     | -     |
| 5H3             | -                 | -                     | -     | -           | -                     | -     |
| Total Hardwood  | 88                | 10.1                  | 14.9  | 3.4         | 48.0                  | 80.9  |
| Grand Total     | 498               | 161.3                 | 359.0 | 107.2       | 93.5                  | 140.0 |



## REFERENCE

### Height

|                           |   |
|---------------------------|---|
| Up to 30 feet .....       | 1 |
| 30 feet to 50 feet .....  | 2 |
| 50 feet to 70 feet .....  | 3 |
| 70 feet to 100 feet ..... | 4 |

### Type

|                                       |   |
|---------------------------------------|---|
| Softwood (up to 25% Hardwood).....    | S |
| Mixedwood (25% to 75% Hardwood) ..... | M |
| Hardwood (75% to 100% Hardwood).....  | H |
| Pine (75% to 100% Pine) .....         | P |

### Canopy Density

|                   |   |
|-------------------|---|
| Up to 30% .....   | 1 |
| 30% to 50% .....  | 2 |
| 50% to 70% .....  | 3 |
| 70% to 100% ..... | 4 |

|                 |     |                               |
|-----------------|-----|-------------------------------|
| <u>Example:</u> |     | ( 50' to 70' in height        |
|                 | 3M3 | ( Mixed                       |
|                 | I   | ( 50% to 70% canopy density   |
|                 |     | ( Well drained alluvial flats |

Each forest stand is denoted by letters and numerals indicating height, type, canopy and density and site group in that order.

<sup>1</sup>White spruce with minor amounts of black spruce and lodgepole pine.

<sup>2</sup>Balsam poplar, trembling aspen and white birch.

REPRESENTATIVE FOOD PRICESFORT SIMPSON/OTTAWA 1968

| <u>Fort Simpson</u>          |       | <u>Ottawa</u> |
|------------------------------|-------|---------------|
| Carnation milk, large tin    | .25   | .17           |
| Oranges, doz.                | 1.09  | .59           |
| Apples, doz.                 | 1.29  | .59           |
| Pancake Mix, 3½ lbs.         | .79   | .64           |
| Pancake Syrup, bottle        | .95   | .69           |
| Jello, pkg.                  | .15   | .10           |
| Potatoes, 100 lbs.           | 18.00 | 2.50          |
| Eggs, med., doz.             | .73   | .53           |
| Bread, loaf                  | .30   | .21           |
| Ham, lb.                     | .89   | .79           |
| Tea, lb. pkg.                | 1.29  | .93           |
| Tinned Fruit                 | .29   | .24           |
| Coffee, lb. pkg.             | 1.02  | .79           |
| Carrots, tin                 | .40   | .19           |
| Peas, tin                    | .33   | .23           |
| Wax beans, tin               | .35   | .19           |
| Blueberry, pie-filling, tin  | .75   | .58           |
| Strawberry, pie-filling, tin | .79   | .50           |
| Meat, Prem, tin              | .65   | .52           |
| Beef Stew                    | .27   | .25           |
| Chicken Stew                 | .50   | .47           |
| Sliced Cheese, pkg.          | .47   | .33           |
| Spaghetti, tin               | .41   | .30           |
| Salmon, tin                  | .47   | .39           |

The risk in handling perishable food-stuffs is clearly evident in the pricing of fruits and vegetables. Leaving out the latter, and considering only the balance of merchandise, prices at Fort Simpson were approximately 10 per cent higher than those prevailing in Ottawa at the time.

## RECONNAISSANCE OF THE SOUTH NAHANNI RIVER

As the terms of reference for the survey included the consideration of all natural resources in the Lower Liard Region, the South Nahanni River and its vicinity could hardly be excluded because of the considerable potential for tourism which would accompany development of the site either as a national park, or a recreation area alone.

Although the river has been the subject of many descriptive writings both official and private, the author felt that a river trip to Virginia Falls would be desirable in order to see firsthand the attributes of the river and perhaps develop a few ideas regarding transport, accommodation and other facilities that might be required for the tourist public if they were to arrive in numbers.

Accordingly, following the advice of Albert Feille and the R. C. M. P. at Fort Simpson, an arrangement was concluded with Mr. F. Sibbeston of that settlement for the hire of his scow, outboard motors and himself as guide for the trip to Virginia Falls, with the understanding that the author would terminate his return journey at Nahanni Butte while Fred Sibbeston would continue on to Fort Simpson.

A food supply sufficient for about ten days, 120 gallons of gasoline in ten-gallon drums, and motor lubricants, were purchased from the Hudson's Bay Co. and loaded. The boat was of scow design, typical of small boats operating on the Mackenzie River, approximately 26 feet in length and powered by two 20 H. P. Johnson outboard motors. The total loading on the boat was approximately 1800 pounds.

We set out from Fort Simpson about 3:00 p.m., on June 8th, and reached the Beaver Dam Rapids, about 30 miles above Fort Simpson on the Liard River, at 6:00 p.m. As with all rapids on these large river systems, the Beaver Dam Rapids appear deceptively small when approached in the broad expanse of the river, but quickly become more impressive once they have been entered and their size can readily be scaled to the size of the boat itself. Camp was made on a large island just above the rapids.

It required most of the following day to make Nahanni Butte, which included a little time spent at a drilling site on some mining claims staked in an area of copper mineralization. An increasing amount of debris was noticed in the Liard River on approaching Nahanni Butte and it became clear that most of it was being transported by the South Nahanni River which was in flood from the addition of melt-water higher in the basin.

On the morning of the third day we proceeded to "Hot Springs" some 50 miles above Nahanni Butte on the South Nahanni River. Over much of that distance the river is braided, meandering and punctuated with numerous rapids. Large amounts of debris becomes rafted on gravel bars in the river bed and is constantly being added to and subtracted from during periods of flood.

Large stands of spruce grow right to the river bank, and wherever these stands are broken, the Liard Range come into full view to the west. Twisted Mountain which is located about 30 miles above Nahanni Butte affords a classic example of folding and faulting in sedimentary rocks and would be of great interest to many tourists.

Hot Springs, about which more is said elsewhere in the report, is situated on the right bank of the river where it cuts through a low terrace of alluvial sands and gravels immediately at the entrance to the first canyon. The main thermal spring itself is located about 300 feet from the river bank in an area of comparatively lush vegetation. Mr. Gus Kraus who lives at the site with his family has managed to pond the water with a small earth dam and it is used by himself and visitors for bathing.

The site is the obvious location of the first camping or accommodation area in any tourist development along the river and, with some investment, the thermal springs could be developed into an interesting attraction as part of a larger and varied tourist package. In addition, a cavernous limestone outcrops in this and other areas near the river and gives rise to some fairly large caves which are worthy of investigation as an added attraction. Some of these require considerable climbing to be reached.

On the morning of the fourth day we set out through the entrance of the first canyon amid considerable debris; made the more worrisome because it was being moved by a river current estimated at ten or more miles per hour. Some of it could not be dodged when in the canyon and this resulted in broken shear-pins, and a loss of considerable distance while effecting repairs and maintaining steerage with the remaining engine.

Between Hot Springs and Deadmen Valley, a distance of about 30 miles, only one disturbance in the water bears watching. This is known locally as George's Riffle and is located about 8 - 10 miles below Deadmen Valley. The riffle is probably caused by large submerged blocks which have broken away from the canyon wall. When the river is in flood the riffle can be got-around by hugging the left bank, but in periods of low water it is apt to occupy the breadth of the channel.

The canyon walls rise to over 1500 feet and in many places are sheer. In other places frost action has dislodged large blocks causing the wall to recede in a succession of steps away from the river. A large alluvial valley, Deadmen Valley, occurs at the upper end of the first canyon and separates it from the second canyon.

Deadman Valley is the obvious location for camping or accommodation area No. 2, not only because much of the legend associated with the South Nahanni River originated with the valley but also because it is picturesque and is the nearest convenient open-ground near the half-way point to Virginia Falls with



development possibilities. The right bank is well forested and the best location for a camping area lies opposite the mouth of the Prairie Creek. An interesting trail could be developed in the dry gulch immediately south of and paralleling Prairie Creek. We proceeded several miles into the second canyon before being forced off the river by debris. Camp was made on a gravel and sand terrace.

We broke camp about 8:00 a.m. the following morning and had not gone far before spotting several Dal Sheel on a ledge about 1000 feet above the river. These remained rooted and watched us till we passed from view around a bend in the river. We arrived at "The Gate" about 1:00 p.m. and caught a number of Arctic Grayling for lunch. These fish range to about 1 1/2 pounds and can be caught at the mouths of cold mountain streams where they enter the South Nahanni River.

The Gate is a natural phenomenon which causes the river to funnel into a channel width of less than one hundred feet. This constriction gives rise to periodic surging of the river immediately upstream from The Gate; a condition which needs to be borne in mind when standing on boulders or gravel-bars already partially awash. A third camping or accommodation site should be selected somewhere between The Gate and Mary Creek River in a stretch of about fifteen miles.

The distance from The Gate to the junction of the Flat and South Nahanni Rivers was covered by 6:00 p.m. with a great deal of difficulty from debris in the river. As this condition was becoming steadily worse it was decided to abandon the trip at the Flat River rather than risk losing the equipment and food supply through a mishap. Accordingly, we returned to a gravel terrace about five miles below the mouth of the Flat River and made camp.

We broke camp at 7:00 a.m. on the morning of the sixth day meaning to make Hot Springs by evening. The trip was uneventful until arriving at a point about 300 yards above George's Riffle where a shear-pin gave out after striking a submerged gravel-bar. By the time the second motor could be started the boat had very nearly entered the riffle with no power. The practice is to run both engines when proceeding upstream, necessary in the circumstances, and to run only one going downstream to maintain steerage. Hot Spring was reached at 5:00 p.m. Nahanni Butte was reached in three hours after setting out the following morning.

In August, the writer did an aerial reconnaissance of the river between its junction with the Flat River and Virginia Falls in order to view that part not covered by boat. All persons with any experience on the river agree that if any danger can be said to exist on the river it would be at Hell's Gate, a few miles above the Flat/South Nahanni confluence. At that point a rapid occurs at a 90 degree bend in the river course and would carry the unwary boater into a perpendicular wall from which there would be no retreat. The drowning of three West German tourists a few years ago was thought to have occurred there.

A fourth camping or accommodation area should be established at Virginia Falls to complete the initial four areas felt by the author to be desirable. The ones suggested at Hot Spring and Deadmen Valley might be considered "close together" by some, but further observation will show that many stop-over combinations are possible with this minimum initial arrangement.

The trip could be made entirely safely, and in quick time, using boats equipped with pumps, jet boats, rather than with propellers. These were employed successfully by Mr. John Kidd, the owner of the Fort Simpson Hotel, for taking visitors to Virginia Falls. Care needs to be taken, however, in their operation over shallowly submerged gravel bars because stones may enter the intake and damage the pump impellers.

In conclusion, travel on the river during flood could be made enjoyable, and the boating season usefully extended, by releasing rafted debris from gravel bars and river banks immediately prior to the summer flooding in June. In nearly all other respects the South Nahanni Site would prove a spectacular park development.

Some photographs of interest are included with the account of the reconnaissance and will serve to supplement the few plates of the South Nahanni River appearing elsewhere in the report.



A - Completing the loading of the boat at Fort Simpson.



B - The G. Kraus home at Hot Springs. Entrance to the first canyon is visible in the background.





C - View near the main thermal spring about one hundred yards to the rear of the Kraus home.



D - View of George's Riffle and the right bank of the river.



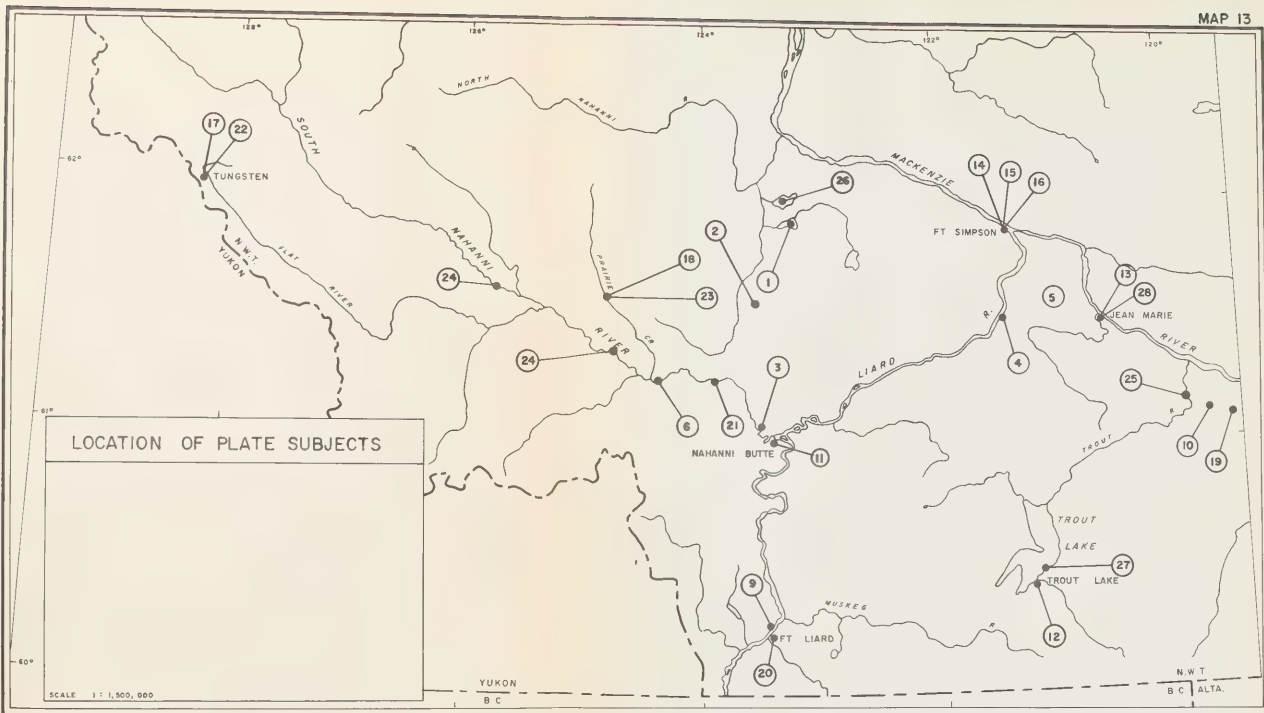


E - Deadmen Valley, looking west to the entrance to the third canyon.



F - Upper end of the third canyon just below the mouth of the Flat River.



















BINDING SECT.

OCT 25 1972

Government  
Publications



